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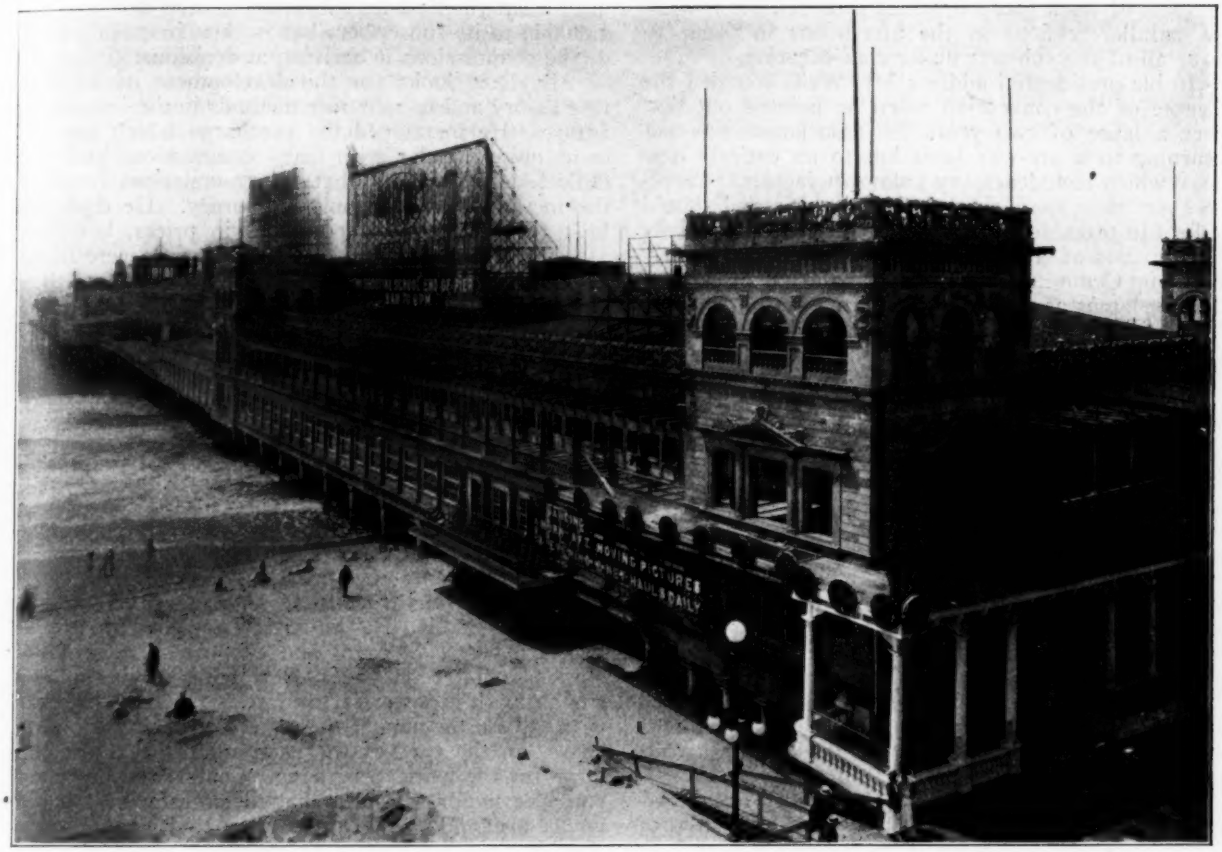


Scene of Forty-Second Convention, Atlantic City, N. J., May 19 to 22.

Report of the National Electric Light Association Convention

Telegraphic Report of Proceedings of the Fifteen Sessions of the Atlantic City Convention—Brief Account of Most Successful Gathering in the History of Central-Station Industry

UNBOUNDED confidence in the stability and future of the central-station industry was the dominating thought impressed vividly on the minds of the over 2000 attendants of the forty-second convention of the National Electric Light Association held in Atlantic City, N. J., on Monday to Thursday of this week. After a lapse of two years during which the thoughts and energies of virtually every man in the electrical industry were turned to winning the war, the association met again to resume its normal activities and to face the many new and important problems that are confronting the industry.

One of the most significant and far reaching acts of the meeting was the consideration of constitutional amendments readjusting the present plan of refunding dues to geographic sections, and placing more of the routine work of the association in the care of these sections. In the opinion of many the association has grown to such an extent that national meetings are becoming unwieldy and the time will soon come when, if it is not already here, it will be necessary to change entirely the character of the national gatherings so that these will constitute virtually executive sessions dealing only with the broad, national problems.

First General Session

The first session of the convention was called to order by President W. F. Wells, at 10 a. m., Tuesday, the spacious meeting hall on Young's Pier being filled to capacity. Mayor Bacharach of Atlantic City welcomed the members and in his remarks showed a keen appreciation of the many problems confronting the industry. The convention immediately plunged into the mass of work planned, which provided for numerous parallel sessions in the afternoons in order to cover all of the subjects under consideration.

In his presidential address Mr. Wells sounded the keynote of the convention when he pointed out that after a lapse of two years the association was not returning to a pre-war basis but to an entirely new basis, which included many unknown factors. "Service First" was the slogan during the war and should be kept in prominence hereafter. He reviewed briefly the activities of the principal committees, particularly the Lamp Committee, which reports the use of carbon-filament lamps as virtually discontinued; the work of the National Committee on Gas and Electric Service which kept in such close touch with the Government at Washington; and finally, the results of participation in the activities of the Chamber of Commerce of the United States.

Referring to the development of association activities, Mr. Wells stated that the Executive Committee recommends changes in the constitution that will provide for greater sectionalization of the work now done by the central office, and will ultimately lead to a great many more members becoming affiliated with the national organization through the various geographic sections. An adjustment will necessarily have to be made to permit of these geographic sections retaining a larger proportion of their dues than at present so that they can conduct the work that will be allotted to them. In order to carry out the work planned for the national association, there will be need for a managing director and a competent staff of assistants.

Speaking of the future of the central-station industry, Mr. Wells pointed out that since high costs of doing business have made it necessary to offer high interest rates to secure the necessary capital needed in the business, he urged that prospective returns from new business be carefully calculated before very much money is spent on enlargements and extensions necessary to secure such business.

Vice-president R. H. Ballard occupied the chair during the address of President Wells, and at its conclusion appointed as a committee to consider the address C. L. Edgar, Boston; J. F. Gilchrist, Chicago; and J. E. Davidson, Omaha. At the suggestion of W. H. Johnson, Philadelphia, a telegram expressing the best wishes of the association was sent to Past-president J. W. Lieb, who is ill in New York.

S. A. Sewall, acting secretary of the association in the absence of T. C. Martin, presented his report, outlining briefly the very strenuous activities at the association headquarters that were necessary to get the various standing committees into action and to prepare the reports and papers for the convention.

W. H. Blood, Boston, then presented his report as the insurance expert of the association, which like the reports of practically all the committees is abstracted in another section of this issue.

Alex Dow, Detroit, chairman of the Rate Research Committee, presented the committee's report in which it was pointed out that the publication of *Rate Research* and the rate book have been continued without interruption throughout the war. Also, as was to be expected, there were an unusually large number of inquiries in regard to rate matters. Mr. Dow explained that most of these questions are answered in *Rate Research*, and he urged that more companies avail themselves of the opportunity to subscribe for this publication. He showed that *Rate Research* has more than justified its existence, as it is not only invaluable to its subscribers but is very frequently used by the commissions in arriving at decisions.

Mr. Dow looks for the development of no new rate theory and no new rate methods in the immediate future. He mentioned the surcharge which has become quite popular with many commissions and this indicates, he thought, that the commissions consider the increased costs as only temporary. He does not look for any decided reductions in prices, however. He also referred to the coal clauses that were made a part of many rate schedules and to the effect they will have on companies that followed the advice of the Fuel Administration and put in large supplies of coal. He also referred to the power-factor clause and believes that it is not yet within our reach in such form that it can be considered anything but experimental. He thought that there is much work to be done during the coming year in readjusting rate problems.

In reply to a question by M. C. Ewing, Wausau, Wis., Mr. Dow said that a power-factor clause in a rate schedule will be a good thing for a customer versed in electrical matters or who has good technical advice available. Other questions were asked regarding the power-factor clause by C. R. Price, New Bedford, Mass.; R. H. Ballard, Los Angeles, Cal.; W. L. Abbott, Chicago, and Stephen Bennis, New York. In his replies, Mr. Dow pointed out that the trouble with a power-factor rate is that the tendency is to sell, on the part of the manufacturer, and to purchase, on the part of the user, motors that are too large for the work to be done. Central stations must convince motor salesmen that their customers should not be oversold. Mr. Dow believes that it is the large number of small motors of improper size that cause power-factor troubles. The surcharge which has been permitted by several commissions is, in Mr. Dow's opinion, an evasion of the situation, adopted because its acceptance is perhaps a little easier and is considered as another temporary war charge by the customer.

Mr. Dow believes that central stations can do much to encourage the use of power-factor-correcting apparatus, particularly the synchronous motor even in small sizes. He stated he knew of no reason why the production of synchronous motors of 75 hp. and up cannot be standardized and these machines marketed at a fair price. Static condensers are also used for power-factor correction with much success. In conclusion, he suggested that central stations be guided by the policy of applying enough correction to balance the cost.

A progress report of the Special Joint Committee on Determination of Power-Factor in Polyphase Unbalanced Circuits was presented by R. J. McClelland, New York, chairman. He outlined the work which this committee will undertake, working with the American Institute of Electrical Engineers and all others who are interested in the subject. He thought the first duty was to propound a practical definition of power-factor and then with the manufacturers evolve a ready means for its determination. This report was discussed briefly by Philip Torchio, New

York, and Alex Dow. Mr. Torchio called attention to the fact that power-factor has been clearly defined by the A. I. E. E. as well as by international committees. Kilowatt energy and reactive energy are the quantities to be measured and a meter which measures the reactive kilovolt-amperes is now on the market. Mr. Dow called attention to a rate employed by the central station at Sheffield, England, providing for a fixed charge per kilowatt of demand and a running charge per kilovolt-ampere. He thought that a modification of this could be worked out in this country.

An interesting paper entitled "The Electric Truck in Modern Transportation" was presented by E. E. LaSchum, general superintendent, American Railway Express Co., New York. This paper included valuable statistics showing operating costs of electric vehicles employed by this company in Boston. The paper was discussed briefly by W. H. Blood, F. W. Smith, G. D. Smith and A. B. Cole, all of whom highly endorsed the arguments brought out by the author and referred to the many ways in which this information can be employed to further the use of the electric vehicle. Mr. Cole brought attention to a new field which has been opened for this vehicle, namely, its use by electric interurban railways contemplating the transportation of freight. Such railways at present have no method of general street transportation and are logical users of the electric truck. In cases he had investigated the horse-drawn and gasoline vehicles had proven entirely inadequate.

Second General (Public Policy) Session

President W. F. Wells presided as chairman of this session, with R. H. Ballard as vice-chairman. Without any preliminary remarks the report of the Committee on the Sale of Company Securities to Customers and Resident Citizens was called for. The chairman of the committee, W. H. Hodge, of H. M. Byllesby & Co., Chicago, not being in attendance at the convention, the report was read in abstract by John G. Learned, of Public Service Co. of Northern Illinois.

Fred Dennis, South Bend, Ind., asked what measures were taken by any of the companies to maintain a reasonable price stability. R. R. Young, Public Service Electric Co., Newark, N. J., answered that in its case the company watches the market very closely and by prompt buying holds the price at all times to normal level.

R. H. Ballard, Los Angeles, Cal., in answer to a question as to the advisability of an agreement whereby the company is to buy back securities at a prearranged price, did not advise this. They represent an investment pure and simple on the part of the purchaser, and the company's only obligation should be to use every proper means to keep up dividends.

Chairman W. W. Freeman of the Public Policy Committee had no prepared report to read. In fact, he had just left the executive session of this committee, and could only summarize extemporaneously some of the matters under consideration by the committee.

The main message which he brought to his hearers was an emphatic warning to guard against the evils of socialism as enunciated by Carl Marx and other recognized socialistic authorities, as well as bolshevism and all other isms. There is no real distinction between bolshevism and socialism and other violent movements, inasmuch as all are the direct antithesis of every fundamental of our Government. A warning was uttered that advocacy of municipal ownership meant giving aid to the socialistic movement. The ordinary man so often gives his countenance or aid to this movement without fully understanding what he is about. He must, therefore, be reached by propaganda counter to the socialistic propaganda which is going out on a vast scale.

For the first time in many years J. W. Lieb, Jr., was unable, on account of illness, to be at the convention. He sent word by Chas. L. Edgar that he has as much electromotive force as ever, but couldn't get out of bed. Mr. Lieb's report as chairman of the National Committee on Gas and Electric Service was voluminous and was read in abstract by Mr. Edgar. Since the energies of all the utility companies last year were turned almost entirely toward winning the war, the report naturally gave point particularly to the various ways in which the industry had aided in

"The Trend of Socialism," by F. G. R. Gordon, Haverhill, Mass., was the paper of the evening. It was received with the most careful attention, for there is no doubt that this is one of the most serious problems confronting the nation and the world. The tendency in all nations to socialize industry is growing at a swift pace. "Five million dollars are spent annually in this nation-wide propaganda which seeks the socialization of your property," said Mr. Gordon.

After citing the many failures of socialist colonies in many parts of the world, Mr. Gordon took up the socialization of business enterprises. He said that governments require two men and two dollars to secure the same results that private ownership accomplishes with one. Every government operates industry with waste, inefficiency and lack of progress. Every nation in Europe owns and operates the wire systems. The wages before the war averaged $2.68 a week in Belgium to $5.80 a week in Switzerland. The service is rotten. A large majority of the telephone users have no service after 10 o'clock at night or on holidays and Sundays, yet, before the war you would have had to pay a little over $77 for a telephone in your house in Paris. Chicago has more telephones than all of France and 90% of the American telephone service is cheaper than the European rate, although the wages are three or four times the wages of the government-operated lines of Europe.

Third General Session

With President Wells in the chair, the third general and executive session was held on Wednesday morning. The treasurer's report was presented by Frank W. Smith and the report of the Membership Committee by Walter Neumuller. The latter showed that there was a gain in new members over last year, although the association sustained a net loss, particularly among the Class B members. This loss was expected and was due to many men entering Government service, as well as to the suspension of the normal activities of the association. The Membership Committee is conducting a campaign to secure new members and satisfactory results were reported.

The report of the Committee on Company Sections, presented by Chairman F. A. Birch, was considered by many to be one of the important features

of the convention as it provides a plan for greatly increasing the membership of company sections by the acquisition of what are to be termed "limited members."

The report was discussed by W. C. L. Eglin, Philadelphia, who considers that the future of the association depends upon the company sections. He admitted that the early plans of the association providing for this membership were not correct, as is indicated by the commendable changes suggested in the report of Mr. Birch. He thought the matter of vital importance to every central-station company and urged that executives interest themselves in this subject.

M. S. Seelman, Brooklyn, called attention to the importance of providing interesting programs for company-section meetings. An effort must be made to have the meetings educational and at the same time interesting and entertaining. Interest in many sections has lagged because the meetings were not planned with proper consideration for these factors.

W. C. L. Eglin, as chairman of the Committee on Constitution and By-Laws presented two amendments, one dealing with the "limited members" for company sections under the plan suggested by Mr. Birch's committee and another amendment relating to Article 17, eliminating the word "fixed" where it relates to the amount of dues to be refunded to geographic sections by the National Association. Heretofore, it has been an amount not to exceed 50% of the fixed dues of the members. Both of these amendments were unanimously passed.

One of the most important and interesting features of the convention was the comprehensive address by George Otis Smith, director of the U. S. Geological Survey, on the subject "Planning for Power." This was delivered following the appointment of the committees on Memorials and Resolutions by President Wells. Dr. Smith first spoke of the close contact between business and the Government during the war and how the unusual conditions made it possible for the Government to take whatever action was necessary to facilitate speeding up of industries. Before the war restriction of excessive growth was accomplished by anti-trust legislation. Fortunately business has survived. Dr. Smith held that too little attention has been given to constructive supervision and the trend must be toward cost lowering and not price lowering by competition. The Government must protect the consumer by helping the manufacturer.

Dr. Smith emphasized very strongly the need for a comprehensive power program, as he feels that electrification is the peace cure for war-time indigestion; this applies to transportation as well as industrial electrification. Dr. Smith called special attention to the transportation problem which, while somewhat relieved, is still very acute. He feels that this can only be solved by the electrification of steam roads, as many railroads have already reached the limit of hauling capacity by steam locomotives, whereas electrified railroads have unlimited capacity.

Electric power from central-station plants was highly endorsed by Dr. Smith for both industrial power and railway service. He stated, however, that he did not believe the electrical industry as efficient as it should be, as it is not uncommon to find many individual, inefficient and frequently obsolete power plants supplying isolated communities. He recommended the establishment of large, modern and efficient power stations to be connected to those now in existence and the development of water power to supplement this supply.

In order to accomplish this much desired end, the Government and the power companies must work together and, in this connection, secretary of the Interior Lane has already asked for an appropriation from Congress in order to conduct a power survey of the entire country and more detailed surveys in the congested manufacturing areas, as in the Boston-Washington district. In this latter area about one-fourth of the total power generating capacity of the country is installed and the control stations in this district consume annually in excess of ten million tons of coal.

Referring again to the urgent need for the development of water power, Dr. Smith pointed out its importance in relation to the conservation of labor. A report of the Alabama Power Co. was cited showing that 84 men are used in a steam plant as compared to one in a hydroelectric plant. To further emphasize the importance of steam-railway electrification, Dr. Smith pointed out that one ton of coal burned in a central-station plant supplying energy to a railroad is equivalent to four tons burned in a steam locomotive.

Dr. Smith referred to the very commendable and important work which is being done in England by the Government to unify generating and transmission systems and emphasized the greater importance of such work in this country. Cheap power is essential to any country expecting to participate in world markets and is particularly necessary in this country if American standards of labor are to stay.

W. W. Freeman, Cincinnati, offered a vote of thanks to Dr. Smith for his interesting address. In offering this motion, he pointed out that the present business now enjoyed by central stations is small in comparison with the possibilities as pointed out by Dr. Smith. It was also gratifying, he said, to have the Government recognize the importance of the central-station industry in the conservation of resources.

J. F. Gilchrist, Chicago, in seconding the motion, which was carried unanimously, pointed out that the utilities must be permitted to acquire such resources and position as will permit them to keep abreast of the growth of the country. He also referred to the need for making farm life more attractive in order to conserve farm labor and the possibilities of the central station in this direction.

Fourth General Session

President W. F. Wells presided at the fourth general and executive session which opened Thursday at 10 a. m. William C. L. Eglin, chairman of the Committee on Safety Rules and Accident Prevention, presented a general report upon the activities of the committee during the past year. Owing to the war the work has been somewhat delayed and certain final recommendations which were expected at this time were not available. Some 50,000 copies of the booklet giving the report of the Resuscitation Committee have been printed and are ready for distribution. Revision of the Safety Code was not possible during the last year on account of the abnormal conditions. However, there has been much discussion with a representative of the Bureau of Standards and the committee is giving careful attention to these matters. Mr. Eglin expressed his thanks to Mr. Scott and Mr. Barton for their active work.

Charles B. Scott, chairman of the Subcommittee on Accident Prevention, then read his report. Four

lines of activity have been followed: (1) Revision of the resuscitation booklet; (2) revision of the resuscitation chart; (3) completion of tentative recommendations for methods of prevention of accidents; (4) educational and publicity methods. In regard to the latter, definite plans have been made to excite greater interest on the part of member companies. Plans were outlined by which the subcommittee may be of greater service as a clearing house for the experiences of the member companies, and recommendations were made to member companies to develop plans to interest the general public in safety movements. These all dovetail with the present tendency of public utility companies to work out large schemes in relation to greater recognition of the human factor in the industries. The N. E. L. A. has studied in the past principally material things. In this great time of change what is more natural for it to study than the non-material things bearing upon employe relations?

Frank W. Smith, chairman of the Lamp Committee, then presented this committee's report. John Howell, in commenting upon this, talked of the advantages of the lamp exhibit at the convention as visualizing the recommendations made more than any amount of printed discussion could. The tables which are given in the report he feels are of great value as showing tendencies. Co-operation with the committee results in keeping down the number of lamp types and even in eliminating some types.

Election of National Officers.

The report of the Nominating Committee was then submitted. This committee consisted of the following named gentlemen: Henry L. Doherty, Charles L. Edgar, W. W. Freeman, Joseph B. McCall, and L. A. Ferguson. Mr. Ferguson read the nominations as follows:

President—R. H. Ballard, vice-president and general manager of Southern California Edison Co., Los Angeles, Cal.

First vice-president—Martin J. Insull, Middle West Utilities Co., Chicago, Ill.

Second vice-president—M. R. Bump, Henry L. Doherty & Co., New York City.

Third vice-president—Frank W. Smith, United Electric Light & Power Co., New York City.

Fourth vice-president—Walter H. Johnson, Philadelphia Electric Co., Philadelphia, Pa.

Treasurer—H. C. Abell, American Light & Traction Co., New York City.

Executive Committee (for three years)—W. H. Atkins, Boston, Mass.; P. G. Gossler, New York City; D. H. McDougall, Toronto, Ont.; and (for two years) R. J. McClelland, New York City.

These officers were elected unanimously.

The new president was inducted into office by Past-President Arthur Williams and Charles L. Edgar. In a short and gracefully worded speech, Mr. Ballard said he felt that his election was a tribute to the Pacific Coast and tended to help in bringing about one common scheme of service to the country, a service which should be satisfactory at every point of contact with the public. The keynote of the association's activities he believes to be that of broad, comprehensive, honest service. Let every company go out with the determination to take full advantage of the greatest opportunity in the history of the industry to demonstrate the soundness of private ownership of public utilities. While the president may be thousands of miles away from the center of central-station activities, he believes that with honest co-operation the year can be made one of the most successful in spite of distance.

Discussion of the Lamp Committee's report was then resumed and a very urgent appeal was made by L. A. Ferguson, Chicago, for member companies not to consider seriously the undercurrent of opinion which is going over the country for the discontinuance of free lamp renewals and putting lamps purely on a merchandising basis. For 30 years in Chicago the Commonwealth Edison Co. has done a successful business and has always paid dividends. Mr. Ferguson feels that this was possible only by keeping in close and constant touch with the customers. The free renewal policy offers that point of contact which enables the company to maintain this close relationship

R. H. Ballard, of Los Angeles, Cal., President-Elect of the National Electric Light Association.

and it would be a great pity for the plan of free renewals to be dropped. Moreover, outside merchandising interests do not care what kind of lamps are sold or what kind of service they will give, and in the end such indiscriminate sale of lamps will surely mean decreased wattage at the socket.

Arthur Williams, New York City, also agreed in this and stated that a previous careful study of the situation had proved that the difference between the lamp-renewal policy in this country and in the European merchandising policy was one of the things which made service among central stations in this country so far superior to the European service.

Prof. Joseph W. Richards, of Lehigh University, secretary of the American Electrochemical Society, then presented a most valuable paper upon "The Importance of Electrochemistry as Related to the Central-Station Industry." This importance is rapidly growing and will have an influence upon increasing central-

station loads. He outlined the various applications of electrolytic and electrochemical processes, giving a brief description of each.

The report of the Committee on the Billings and Doherty Prizes was read by A. S. Loizeaux, Baltimore. Only 10 papers were submitted during the past year, whereas 15 were submitted two years ago and 20 were submitted three years back. The papers last year also were not generally as valuable as those presented in previous years. Criteria for judging were 50% on value to the industry, 25% on originality and 25% on literary excellence. The winners of the prizes are G. M. Armbrust, the Doherty prize; A. F. Bromwell, the Billings prize, and B. E. Alden, honorary mention.

C. L. Edgar, Boston, read the report of the committee on the President's Address. It recommended that the address be reread by members of the N. E. L. A. on account of its reference to socialism and municipal ownership. A resolution was adopted to call the attention of the Executive Committee to the address for such action as it may desire to take. E. A. Bailey called attention to an article by George M. Webster, New York, entitled "Theoretical Depreciation—A Menace to the Public and to the Investor."

T. E. Bibbens made a motion, which was adopted, that the president of the N. E. L. A. be requested to appoint a committee to consider equitable and just compensation of employes of service companies. The idea was suggested that this committee study and report on a scheme of profit sharing for employes.

After Arthur Williams expressed the appreciation of the association for the efforts of all who contributed to the success of the convention, the meeting was adjourned.

First Technical and Hydroelectric Session

The first technical and hydroelectric session was called to order by M. R. Bump who introduced R. J. McClelland, chairman of the Technical and Hydroelectric Section. Mr. McClelland called attention to the fact that technically trained men are the most adequately prepared of all professional men to consider political, economic and industrial problems. The fact exists, however, that relatively few technical men officially are considering such problems. Several reasons exist for the fact that engineers have in the past been engaged in solving technical problems exclusively instead of devoting part of their attention to purely social considerations. These reasons may be ascribed to the lack of interest among engineers in anything other than technical matters and to the possible distrust on the part of the public of the ability of engineers to consider properly anything but technical problems. The general condition of engineers will be benefited by their own effort to interest themselves in political and financial affairs. Engineers are already beginning to realize that they have social as well as purely technical responsibilities and to become interested in national affairs. As a result of their awakening, engineers are beginning to be recognized more nearly for what they are worth than they have been recognized in the past. Local sections of N. E. L. A. can assist in promoting the recognition of engineers by encouraging them to devote a part of their time to studying political and economic conditions.

The purely technical discussion began after the chairman's address. The report of the Committee on Prime Movers, which filled 160 pages, was given in abstracted form only, so that as much time as possible might be devoted to comments and discussions. The topic of the report includes nearly every object to be found in a power house between the steam turbine and the coal pile. Subtopics considered during the discussion included turbine operation, higher steam pressures, stokers and grates, powdered fuel, etc.

The matter of limiting the sizes of turbines was mentioned. The trend of opinion seemed to be, however, that the large turbines that have been installed operate satisfactorily. W. S. Finley, Jr., New York, mentioned the fact that the Interborough Rapid Transit Co. has an installation of three 30,000-kw. and one 60,000-kw. turbines that operate on a six-day basis. The performance of the units is satisfactory. Others who discussed the section of the report devoted to turbines included W. L. Abbott, H. M. Cushing, Philip Torchio, O. Jungyren and H. B. Bryan.

The use of high pressures and their effect on superheaters was also discussed. In the opinion of the speakers, who were Richard Rice, I. E. Moultrop, Robert Wyld, A. L. Meyer, D. B. Rushmore, and O. Jungvren, higher steam pressures are to be expected in the not distant future. The installation of an experimental laboratory for the purpose of investigating high pressures was suggested. Stokers and grates were discussed by H. M. Cushing, C. B. Grady, T. A. Marcks, E. B. Ricketts and John Dallas.

Considerable attention was devoted to the matter of powdered coal. The consensus of opinion was that there is no doubt about the value of powdered coal as a fuel and that firing apparatus at present is perfected satisfactorily. The principal difficulty in the use of the powdered material is in pulverizing it. On account of the investment required for pulverizing equipment, only plants that use large quantities of fuel have been equipped with that machinery. W. L. Abbott, Chicago, mentioned a new device for firing powdered coal that is being tested at Purdue University and then explained a method by which he has been able to store coal outdoors for eight years without being bothered with fires. He explained that the prevention of circulation of air is necessary to the elimination of fires. Others who participated in the discussion of powdered fuel were W. S. Finley, Jr., S. B. Flagg and T. A. Nash.

Second Technical and Hydroelectric Session

The second technical and hydroelectric session was held at the Hotel Traymore, R. H. Ballard, vice-president, N. E. L. A., in the chair. The session was devoted to the reading and discussion of two committee reports, one of which was submitted by the Committee on Underground Construction and Electrolysis, the other by the Committee on Overhead Lines and Inductive Interference.

Several methods of underground construction were suggested by different speakers, their purpose being to avoid a considerable amount of trouble. A number of ideas and suggestions were mentioned for the consideration of the members and those present, by which cable burn-outs and cable and manhole fires might be largely eliminated. Some of the construction methods urged were to employ the proper kind of material for

filling up the joints of splices, cable splicers should be instructed to take special care to make proper joints and use good workmanship. The use of large duct section so as to permit cables to be withdrawn and pulled in more easily and so as to permit larger cables to be used eventually was advocated. Uniform manhole spacing was shown to be advantageous, as standardizing cable lengths and reducing amount of scrap involved, while proper splice protection by suitable materials was stated to be worth while. The opinion was expressed that after installation, underground cables should not be overloaded while on test.

E. B. Meyer, chairman of the committee, described the experiences with underground conductors in Newark. During 1917, joint failures began to multiply for no apparent reason. There were 273 miles of 24,000-volt underground cable installed, necessitating about 4400 joints. To reduce the number of cable failures at the splices a school was formed, the purpose of which was to give instruction in cable splicing; and to determine the best form of joint, investigate the quality of paraffine used for filling the joints and the effect of different splicing compounds. The result was that a compound other than paraffine was adopted with which all new joints have been filled and 335 old joints have been drained off and filled with the new compound. One of the objections of paraffine found was that it has a large coefficient of expansion, causing voids to occur between conductors, rarified air and inonization and breakdown. Since the formation of the school and the adoption of the new splicing compound, only two joints have broken down, and the cause of breakdown was found to be on account of defective workmanship.

A. P. Towne explained that the Committee on Underground Construction and Electrolysis did not recommend any particular compound for joints, because no one compound had been found markedly superior to any other compound for all cases. He urged upon those present the advisability of adopting suitable exploring instruments for fault detection and location instead of adhering to the old, expensive and slow method of opening long and numerous stretches of pavements and roadway. He mentioned the fact that also by adopting larger sizes of cable, the number of cable burn-outs can be reduced. Load requirements are increasing, also density of loading, hence many of the cables installed today are cables chosen for conditions as they existed in the past. By adopting large cross-sections, future loads can be taken care of and immediate cable failures reduced.

R. O. Bentley stated that in his opinion, cable ducts should have an inside diameter or overall dimension not less than 4½ in. The larger sizes of duct permit installing larger cables as load requirements demand. He also suggested standardizing the distance between manholes in so far as possible, and using smaller overloads during test. He has experimented with cable joints that are no larger than the cable.

J. W. Sylvester discussed matters pertaining to cable burn-outs and fires. He gave details on the prevention of fires and burn-outs by supporting the cables in the manholes on non-conducting and non-inflammable material. The practice adopted in Philadelphia of employing soapstone shelfs supported by angle irons built into the sides of the manholes was stated to have proved entirely satisfactory from all aspects.

J. B. Noe described some tests made in New York, upon cement coverings for cables. Cement bound to the caple by rope was found less satisfactory than cement coating bound by metal lath in all ways.

The report of the Committee on Overhead Lines and Inductive Interference was presented by A. E. Silver, chairman of the committee. The discussion following the presentation of this paper showed a desire of the speakers to unite harmoniously with the telephone interest in settling difficulties due to inductive interference and other causes and preventing them from occurring.

John B. Taylor rather blamed the telephone interests because they do not report the results obtained from adjustments made by the power companies with a view to eliminating interference. The telephone companies specify the character of the disturbances and should tell the effect of efforts made to eliminate interference, therefore. Telephone companies object to the use of the grounded neutral by the power companies, but they themselves use the grounded neutrals.

F. D. Nims in discussing the fact that telephone and telegraph disturbances have been observed to exist in parallel power and telephone cables when these lines have been separated by as many as thirty odd miles, pointed out that a third medium may be responsible for the disturbance. This third medium is a cross circuit of some kind that tends to neutralize the intervening distance between parallel circuits. The preceding reason for the disturbance was mentioned by J. B. Taylor. Other speakers brought out the fact that adjustments of difficulties caused by close proximity of power and communication conductors in Michigan are made by causing the removal of one of the lines to a more satisfactory location and charging the cost of the removal to the two companies concerned.

Paul Spencer gave it as his opinion that the joint use of poles by power and telephone and telegraph companies will not only be necessary but compulsory in the future. Utility commissions throughout the country are going to ask why one line of poles does not suffice to carry power and telephone conductors in the less thickly populated districts. There seems to be little excuse for delaying the joint usage of poles by lines employing medium voltages at the present time. As a matter of fact, specifications that are satisfactory to all parties concerned have been agreed upon already for circuits employing low voltages. Negotiations are pending in Philadelphia for the preparations to cover poles carrying lines operating at higher voltages.

Third Technical and Hydroelectric Session

The third technical session was called to order Wednesday afternoon by President W. F. Wells. In the absence of R. F. Schuchardt, chairman of the Committee on Electrical Apparatus, A. H. Lawton read an abstract of the report of the committee on transformer practice. The discussion referred to the several sub-topics in the order in which they were read. H. Carl Albrecht opened the discussion on transformer practice, emphasizing the fact that voltage ratings below 33,000 were standardized last year and that the committee is thinking of extending the rating to 120,000. The discussion developed the fact that several speakers advocated standardizing the polarity of transformers. Since the large majority of transformers have additive polarity, it is suggested making all distributing transformers additive and re-

quiring a few manufacturers to adopt the additive standard. The cost of standardizing polarity will be small. Those who discussed the subject were W. F. Wells, H. B. Gear, G. F. Morrison, and A. H. Lawton.

A. A. Meyer read the portion of the report devoted to substation practice. The discussion brought out the fact that the kinds of substations are numerous and that the ordinary design is such that the substations cannot be extended as the load increases, hence must be replaced entirely by larger units.

Some trouble has occurred by explosions of outdoor oil switches due to moisture of condensation and to oil fumes collecting above the oil. The trouble is not general, however. A. H. Lawton prescribed a method of preventing explosions by permitting the circulation of air above the oil to scavenge the fumes. Mr. McNeal, Pittsburgh, recommended replacing all air breakers with oil breakers to eliminate the oxidation that occurs in air. The experience of those who spoke on the subject of fires in motors is that many of the fires are started by the ignition of lint and carbon dust on the armature rather than by short-circuits or burnouts. Waste should never be used to clean a motor. Tests by the General Electric Co. show that when fires occur water is the most effective extinguisher.

F. V. Magalhaes read an abstract of the report of the Committee on Meters. The discussion showed that considerable difficulty is encountered by utility companies in employing competent meter testers. Various means have been tried to eliminate the difficulty, the most recent and satisfactory of which has been to start schools for meter testers. Men are more adaptable to meter testing than women. W. L. Wadsworth, W. H. Fellows and W. Partridge gave their experience in establishing educational courses of from one to twelve weeks.

Perjodic testing of instruments transformers was recognized as necessary. W. H. Fellows suggested adopting a short method of testing. Mr. Gibbs, Westinghouse Co., said that the accuracy of modern transformers does not change. Transformers constructed before 1908 should be checked, however, as their accuracy does change. C. H. Ingalls brought out the fact that transformer troubles may be caused by unknown overloads rather than by aging.

The Warren timing instrument was described briefly by Mr. Warren himself. The first motor made for the clock has been running continuously at 3600 r.p.m. during two years and is still functioning accurately. The Warren instrument can be used as a stop watch and is 40 times as delicate as the ordinary stop watch. The idea was unanimous that fusing of transformers is undesirable. Messrs. F. V. Magalhaes, Wm. L. Wadsworth, W. H. Fellows, Dellham and J. C. Martin stated that they use no fuses on systems carrying as much as 23,000 volts. Only one burnout was mentioned and that did not injure the transformer.

The officers elected for the Technical and Hydroelectric Section are I. E. Moultrop, Boston, Mass., chairman; W. A. Carl and A. H. Lawton, vice-chairmen; R. F. Schuchardt, member Executive Committee.

First Commercial Session

President Wells opened the first session of the Commercial Section on Tuesday afternoon and introduced Charles J. Russell, Philadelphia, chairman of the section, who delivered the opening address. This dealt in detail with the numerous subjects to be presented during the convention, particular emphasis being placed on the reports on electric furnace operation. Mr. Russell spoke of the increasing amount of work which is being undertaken by the section and recommended that a survey of this work be made with a view to having it apportioned to the various subdivisions and also to the geographic sections and perhaps also company sections.

J. G. Learned, Chicago, chairman of the Committee on Finance, then presented his report, which showed comparatively few expenditures within the past year because of curtailment in the work of the section; a balance in excess of $12,000 was reported.

R. F. Bonsall, Baltimore, presented the report of the Committee on Commercial Service and Relationship to Customers. The discussion was opened by H. W. Peck, Schenectady, who took an exception to some of the recommendations made by the committee. He did not believe that meters should be allowed to remain connected in vacant premises for more than six months. He also thought it poor policy to refund deposits at the end of a year, as the Schenectady company has had frequent instances of customers moving away from the city without closing their accounts. He reported that the policy of his company is to pay meter readers 1.2 cents per meter and to make a deduction of 10 cents per meter for errors. He also mentioned a bonus of $5 which is given to meter readers for reporting cases of tampering with the wiring.

Henry Harris, Pittsburgh, thought that interest should be paid on deposits annually without waiting for the request from the customer. He also believed that central stations should be very liberal in the matter of credit, as his experience is that there is only about 0.2% loss on domestic customers.

W. M. Halsey, Newark, N. J., urged against requiring customers to sign a new application for service when moving from one location to another. He pointed out that the credit department very seldom refers to these signatures and it simply causes the customer unnecessary trouble and delay.

R. S. Hale, Boston, spoke of a plan which is to be inaugurated by one of the companies in which he is interested of selling stock in small allotments. New customers will be encouraged to deposit this stock as security in lieu of a cash deposit. He also referred to a new plan which had been adopted of transferring service, when the tenant of an apartment building moves, to the owner or agent of the building. This permits the latter to show the apartment at night and also provides for immediate service for the new tenant.

R. S. Hale, chairman of Committee on Wiring, read his report, touching on subjects of standardization of cords, plugs and receptacles, standardization of electric range connections, education of the public concerning proper use of appliances to insure safety, concentric wiring, elimination of the neutral fuse, sizes of wire, the National Electrical Code and the cost of wiring and tests of wiring conducted under the committee's supervision.

F. B. Pembleton, A. G. Declercq, E. A. Edkins, W. H. Blood, W. A. Dannenhauer and Louis Kalischer took part in the spirited discussion which followed Mr. Hale's report and which reflected the concensus of opinion, general in the meeting, that wire

sizes and the quality of wiring installation should not be reduced at this time.

Fred R. Jenkins, Chicago, chairman of the Committee on Education of Salesmen, described the courses which are available to central stations for the training of employes in both commercial engineering and practical electricity. Mr. Jenkins urged that N. E. L. A. member companies take advantage of these courses in rebuilding their present impaired organizations. William Halsey, Newark, N. J.; C. F. Henderschott, New York City, and W. P. Fenninger, Brooklyn, N. Y., spoke briefly in the discussion that followed, endorsing the work.

R. H. Tillman closed the afternoon session with an abstract of the report of the Committee on the Electrical Salesman's Handbook, of which he is chairman. He has proposed a list of monographs on new topics to be included in the next issue of the handbook, covering subjects of special interest to the electric power salesman and electric heating sales specialist.

Second Commercial Session

R. H. Ballard called the meeting to order and introduced C. L. Law, chairman of the Lighting Sales Bureau, who presided. The various committee reports were called for as follows: Commercial Aspects of Lamp Equipment, O. R. Hogue, chairman; Commercial Aspects of Street and Highway Lighting, C. C. Durfee, chairman; Residence Lighting, C. W. Johnson, chairman; Outdoor Lighting, H. H. Magdsick, vice-chairman; Electrical Advertising, E. A. Mills, chairman; Store Lighting, A. L. Powell, chairman; Lighting of Public Buildings, G. Bertram Regar, chairman.

In the discusion of residence lighting the point was made that women represent an increasing factor in influencing home illumination, very largely owing to their greater appreciation of artistic effects. One company had developed a scheme whereby the company's salesmen work with the contractor until the contract is secured, which worked satisfactorily on contracts for old house wiring. Another member urged that to get the proper amount of revenue from the customer an active campaign to educate the architects should be started, for as a rule the architects seem to pay little or no attention to the wiring details, leaving the location of outlets largely to the contractor. The inadequacy of such a system is illustrated by the fact that, in many instances with only one place in the room for a bed or dresser to stand, an outlet is often located in such a place as to be behind the furniture where it cannot be readily brought into service. Also, there are never enough outlets. With sockets and receptacles of all kinds installed ready for use, there is a stronger incentive to buy electric appliances. They are the silent salesmen. G. H. Stickney of the Edison Lamp Works, Harrison, N. J., carried this point further by warning that after the architect is sold, look out for the contractor, as wiring is generally left to the last, and if there is any sparing of costs it is likely to crop out in this part of the work. Finally, the public itself must be educated so that it will demand from both the architect and contractor a thorough and modern wiring scheme that will permit of utilizing electricity to the utmost.

In a written comment upon the lamp equipment report, O. L. Johnson said that many purchasers think size, shape, gage of metal, etc., have little bearing on the efficient operation of a lighting fixture, which is a great mistake for local lighting. A properly designed dome fixture, it was explained, is most efficient and at the same time prevents the annoyance which comes of theft or the "swiping" of high-power lamps by one department from another in a factory or industrial building.

Mr. Durfee's report excited the comment from one member that it seems strange that street illumination which is fundamentally the most important branch of central-station business, nine times out of ten is the most neglected. Beginning with the central district of a city where the most brilliant lighting is called for and carrying this out in a somewhat lesser degree through main arteries, branch streets and into the country highways, there is, in adequate street illumination, the greatest advertisement or incentive for the abundant use of illuminants in the home and business establishments.

W. D'A. Ryan had made some investigations of two rural routes from Buffalo to New York, with a view of ascertaining distribution problems. It was found that the greatest distance between electric stations along these routes was 15 miles, making highway illumination entirely feasible from the distribution standpoint. Highway illumination has perhaps been carried out to a more noticeable extent in the Far West and Pacific Coast cities than elsewhere. For city work, he asserted, that property holders were willing and glad to pay for intensive lighting costing anywhere from $50,000 to $110,000 a mile. The Los Angeles system cost $75,000 a mile, but it will raise the standard of illumination all along the coast. When it comes to high-current white way work he is a strong advocate of the arc lamp. A change from present arc installations without the most careful study of the problem from all angles can only be undertaken at risk of a very serious mistake. This statement was made with due consideration given to the excellence of modern incandescent systems.

Mr. Magdsick's report brought from Mr. Ryan a remark as to the wonderful new incandescent searchlight which is equal in power to the best 18-in. arc and does not require an attendant.

Third Commercial Session

Three important topics were discussed at the third commercial session, called to order Wednesday afternoon by Martin J. Insull. The meeting was then turned over to George H. Jones who presided. The entire session was in the form of a round table discussion, dealing with isolated plant costs, electric furnaces, and power-factor in customers' installation. J. Lundgaard of Rochester opened the discussion on "The Effect of the War on Isolated Plant Costs." J. W. Myer presented a very comprehensive paper on this subject showing how production costs have increased in isolated plants during the war and the opportunity that now exists for securing this business, including a great deal of cost data showing price variations in all elements making up production costs.

Stephen Bennis, opening the discussion, pointed out some of the principal advantages of central-station service over isolated plants. One of the important

disadvantages of service from a private generating station is the absence of voltage regulation which results in poor quality of lighting and considerably shortens the life of lamps. He also mentioned that capital invested in an isolated plant could in most cases be used to better advantage if invested in the business of the manufacturer. He spoke of the importance of ice making as a field for central-station service. R. P. Knowlton, Philadelphia, discussed ice plants with special reference to the cost of power. M. S. Seelman of Brooklyn called attention to the increasing costs of central-station service and the effect that the higher rates will have on large power contracts when they are to be renewed. He said several important contracts would expire during the present year in Brooklyn and the question of on what basis they could be renewed was a very serious one. Morse Dell Plain, Hammond, Ind., held that isolated plants will never be able to operate at the old level of cost and he thought this would take care of the increased rates which central stations would have to apply on renewing old contracts; also that because of the superior service rendered central stations were entitled to higher prices than power could be produced for in a private plant.

Dr. C. F. Hirshfeld, Detroit, presented in abstract form the report of the Electrical Heating Bureau prepared for presentation at the 1917 convention. The discussion was divided into two sections—one dealing with electric furnaces for non-ferrous metals, the other dealing with electric steel furnaces. The discussion of the former was opened by J. D. Noyes, Detroit, who said there were 20 non-ferrous electric furnaces on the lines of the Detroit Edison Co. The connected transformer load aggregates over 6000 kw. with annual consumption between 10 and 12 million kw-hr. Four or five additional furnaces on order will increase the connected load by 2000 kw. This business is taken on the company's regular 4600-volt primary power rate, and measured through regular power meters. The customer furnishes the transformers in accordance with the company's specifications. Installation and maintenance is taken care of by the central station. Mr. Noyes pointed out that little or no difficulty is encountered in securing this class of business and there is a considerable amount of it in immediate prospect, especially in the field of brass melting because of its inherent advantages.

E. L. Crosby, Detroit, said that central stations had shown very little interest until recently in the electric furnace field. He referred to the many advantages of the electric furnace for brass melting, pointing out that in cases under his observation the cost has been written off in ninety days because of the great saving in metallic loss alone. He explained the inaccuracies in referring to definite consumption per ton without taking into consideration all of the factors involved. Pointing out the tremendous possibilities, he showed that only about 1% of brass is being melted electrically today and there is no reason why this should not be increased to at least 80%. E. F. Collins of Schenectady spoke of the advantages of the electric furnace showing that the rates and kilowatt-hour consumption are the last things to be considered as they are insignificant in comparison to the advantages. Special mention was made of the absolute control possible with electric furnaces. Carl H. Booth, Chicago, described a new electric arc furnace of 200 lb. capacity which has been developed to meet the need of the small user. This furnace is of the rotating type and can be operated at any reasonable power-factor by the introduction of reactances.

Morse Dell Plain, Hammond, Ind., opened the discussion on electric furnaces for steel making, showing that a new grade of steel has been made possible through electric smelting. Electric steel has been shown to be equal in quality to crucible steel and is of undoubted superior uniformity. C. B. Gibson, Pittsburgh; A. C. Smith, Buffalo; R. P. Tillman, Baltimore; P. B. Short and W. E. Moore of Pittsburgh, took part in the discussion. Recent practice in this field was discussed, the consensus of opinion being that the market for electric steel is assured.

The concluding feature of the program was a discussion of power-factor in customers' installations, the discussion being led by R. H. Knowlton of Philadelphia. In the discussion, which lasted beyond the usual hour various methods for correcting power-factor were discussed in some detail. Static condensers and synchronous machines were given special attention. The discussion was participated in by R. H. Tillman, Baltimore; C. F. Scott, New Haven; Robert Treat, Schenectady; B. H. Gardner, New Britain, Conn.; Joseph McKinley, Pittsburgh; Will Brown, Minneapolis; W. R. McLeod, Jersey City, and A. C. Dartin of Schenectady.

Fourth Commercial Session

Electric ranges and discussion of that adjunct to the range, water-heating apparatus, occupied attention at this meeting, which was full of enthusiasm over the prospects for great development in this field. Chairman John G. Learned presided. The one report was from the Committee on Electric Ranges, by C. E. Michel, Union Electric Light & Power Co., St. Louis, chairman, followed by discussions on commercial information and technical features of the business.

It was stated by C. E. Greenwood, Boston, that not until four years ago did they start upon an active campaign for electric cooking load in that city. This campaign was necessarily interrupted during the war when no effort whatever was made to secure such business, and yet last year the Boston central station sold 150 ranges to people who came to its various stores, and turned down, in addition, some 200 more probable buyers. In the smaller New England towns in the vicinity of Boston the company has sold to date 1500 ranges, and in the city of Boston, 2000.

George A. Hughes, father of the electric range business, said that during the war manufacturers of course experienced a diminution of their business but now that the war is over the prospects are exceedingly bright. The first quarter of this year they have sold more ranges than during the entire year 1918. He believes that in selling ranges to the public more emphasis should be laid upon selling the "cooking by electricity" idea than upon prices or cost of operation. This idea should be promoted by the central station upon every opportunity, especially since the range user is a profitable customer. He cited one instance where 1400 range customers averaged $4 a month as against an average lighting revenue of $2 per customer per month.

One of the delegates, who had been out of touch with the business for two years and consequently spoke more from the standpoint of a disinterested observer, said that in his opinion price is a secondary consideration. If a person really is sold on the elec-

tric-cooking idea and its advantages, price will not stand in the way. Neither is the price of current a considerable factor, as has been demonstrated in the history of the development of the electric incandescent lamp.

M. S. Seelman, Jr., Brooklyn, N. Y., did not agree upon the matter of rates for current not being a factor, at least in a community such as his. There it is very much a rate question and they are not able to justify a cooking rate which will permit any great amount of range business.

Mr. Anderson, Albany, N. Y., said that his company had not gone after range business until recently as it is a combination company selling a very good quality of gas at a low rate in the city. Their range selling activities therefore have been confined so far to outlying and farmer lines and the results there have been excellent.

A. C. Osborne, formerly of the Washington Water Power Co., gave a very carefully prepared written discussion upon the subject of heating water by electricity. The idea running through this, backed by detailed figures of operating costs, is that the electric range can never be complete in its functioning until electric heating of water is instituted as an adjunct. In other words, the completely electrified kitchen is necessary in order to put the electric range on a competing basis with gas, and this is not possible unless there are electrical means provided for heating water electrically also.

Fifth Commercial Session

Chairman Charles J. Russell presided at the fifth commercial session, held on Thursday afternoon. The report of the Committee on Publications was called for and presented by Chairman F. D. Pembleton. No discussion followed.

The order of the program was changed to admit at this time the illustrated lecture by William A. Durgin, Commonwealth Edison Co., Chicago, upon the subject "Our Manufacturing Buy-Product." This lecture has been presented by Mr. Durgin on other occasions, but has been elaborated upon. The subject to be forced home in the minds of central-station men as well as the light-consuming industrial plants is that of higher intensities. It embodies the results of the extensive lighting surveys recently made in Chicago, in which testing engineers made careful analyses of conditions in 269 plants aggregating 19,000,000 sq. ft. of floor space. These surveys show an average of only 1.5 ft-cdl. 3 ft. above the floor, whereas intensities of at least 10 ft-cdl. should be used to obtain maximum production. In definite instances in Chicago with an increase of 5½% in lighting cost increases of 20 to 25% in production were obtained. To visualize the effect of proper intensities, Mr. Durgin exhibited a model of a factory wherein with the use of small incandescent lamps variously placed and with lights shining through windows in the side the effect produced by different lighting systems in all parts of the factory could be demonstrated, also the effect of proper and improper daylight installation. In addition there were exhibits of hideous examples of lighting fixtures taken from factories where they were being used under operating conditions, as well as examples of modern types of fixtures.

In several parts of Mr. Durgin's lecture he emphasized the importance of securing not only sufficiently high illuminating intensity and uniformity of light distribution, combined with freedom from dense shadows, but also freedom from glare. The injurious effects of the latter on the eye and the liability of increase in accidents because of it were clearly demonstrated. In showing the latest types of industrial lighting units he recommended use, wherever possible, of those in which glare elimination has been especially provided for, even if this involved a slight loss in efficiency.

Bearing directly upon this discussion Capt. H. Logan gave an actual experience in a jute mill whose production was placed under his control. In the beginning the light intensity was 1.5 ft-cdl. on the lighting plane and the mills running at full capacity. With the installation of proper lighting equipment, approximating 9 ft-cdl. the production of the machines was increased from 59.4 lb. to 70.1 lb. per hour. There is no doubt in Mr. Durgin's mind that the fact that increased lighting will produce with a certainty very largely increased production is a matter which should receive the attention of the biggest men in the industry.

Especially is this true, when, as pointed out by Ward Harrison, 15 to 40% of the purchase price of manufactured articles is due to overhead charges on production. With shortening up of factory hours it would be possible to operate in many industries two shifts, lapping over into the morning and evening dark hours and with the aid of proper illumination and sufficient intensities fully as much efficiency could be obtained in production in the late shift as in the early shift.

The report of the Committee on Co-ordinate Advertising and Sales Campaigns was presented by J. M. Wakeman in the absence of Chairman Henry Harris.

E. R. Davenport then read, as chairman, the report of the Committee on Merchandising. Commenting upon this report, H. H. Newman remarked that central-station companies were following along the lines of least resistance in selling electric current-consuming devices. They should take a tip from other lines of merchandising business and campaign for business on certain devices, such as fans and so forth, during the off-peak season. The warning was also sounded by another member that unless the central stations adopt the modern merchandising methods employed by high-class dealers and department stores they will eventually find themselves in the position of doing but a small proportion of the electrical merchandise business.

The report of the Nominating Committee, consisting of R. R. Young, Joseph F. Decker and E. W. Lloyd, was then received. The following named gentlemen were nominated and unanimously elected officers of the Commercial Section for the ensuing year:

Chairman, John G. Learned, Chicago; vice-chairmen, M. S. Seelman, Brooklyn, and Henry Harris, Pittsburgh; secretary, R. H. Tillman, Baltimore.

Members of Executive Committee: F. H. Gale, Schenectady, N. Y., representing manufacturers; F. A. Ketchum, New York, representing jobbers; L. H. Lamont, Chicago, representing contractors; R. S. Hale, Boston, and T. Lungaard, Rochester, N. Y., representing central stations.

Adjournment of this session late on Thursday afternoon brought the forty-second convention of the association to a close.

First Electric Vehicle Session

The first electric vehicle session was presided over by D. H. McDougall as chairman with E. S. Mansfield as vice-chairman. The opening address was made by Chairman of the Section E. S. Mansfield, followed by the reports of the secretary-treasurer and the following committees: Federal and Municipal Transportation, James H. McGraw, chairman; Garage and Rates, J. H. Miles, chairman; Legislation, G. A. Freeman, chairman; Manufacturers and Central-Station Co-operation, George B. Foster, chairman; Standardization, E. R. Whitney, chairman; Operating Records, C. A. White, chairman; Transportation and Engineering, F. M. Feiker, chairman.

In the discussion, George B. Foster gave the industrial truck credit for putting the storage battery into the industry. The storage battery truck must be used for industrial transportation on account of the item of insurance.

One company in Chicago has a large enclosed loading platform. After trying electric trucks in along with their gas trucks the latter were eventually thrown out because it was found that the electric could be garaged on the premises under this enclosure which was impossible with the gas trucks owing to the prohibitive insurance charges. In discussing garage and rates, George Drake Smith emphasized the point that in the advertisements of the three leading ones, gas truck manufacturers, the space was almost entirely devoted to transportation and transportation service, rather than truck details. What the electric truck industry needs is more manufacturers and a greater development of this transportation idea.

R. A. Grove recommended, in the discussion of operating records an exchange of figures on operating costs between all companies, by using the forms suggested. While some companies might feel that these figures should be withheld from general circulation, still they could be submitted through the secretary for compilation in general tabulated results, where individuality need not be divulged. Mr. Foster also pointed out that careful scrutiny should be given to returns from any company that indicated questionable findings and such figures rechecked to ascertain the cause for any remarkably exceptional detrimental showing. He knew of one company that was putting 100% more current into its batteries than another under similar conditions yet did not realize something was radically wrong. In these cases a remedy should be instituted before results of this nature go into tabulated statistics.

The two papers of the session were "Present and Future Status of the Electric Vehicle" by Rodney K. Merrick, Commercial Truck Co., Philadelphia, and "Electrical Vehicle from a Salesman Standpoint," by J. B. Cardoza of the Walker Vehicle Co., New York. Mr. Reilly, of New York, stated that even if a gas truck can be operated at 25 miles per hour it would be more economical to operate two electric trucks in its place operating at lower speeds. A gas truck operating at such a killing speed as 55 miles per hour will rapidly run itself into the scrap heap to say nothing of danger to traffic and ruination of roads. An electric can run as fast as economy and safety will permit a gas truck to be run. A man to operate an electric truck costs six or seven dollars a week less than must be paid for the high tension, temperamental gas truck deliverer. A stevedore can and has been taught in three or four days' time to be an excellent electric driver.

G. D. Smith, Orange, N. J., said that when direct current can be delivered to a garage no trouble is encountered but in all alternating-current districts the garage owner faces an engineering problem at once. Steps must be taken to overcome this difficulty in order for the electric truck to come into its own. From the salesman's standpoint almost everything is in favor of the electric except the noise and rattle of the gas car, which to the uneducated public spells infinite power. According to the figures of the motor truck class of America it costs over $29 a day to operate a 5-ton gas truck. This checked very closely with similar figures presented at a February conference at the motor truck show in New York. On the other hand the cost of operating an electric five-ton truck is less than half this amount, according to G. D. Smith and W. M. Halsey, of Newark. In an actual case 25 5-ton electric trucks operated by one of the largest truck operating companies in the country averaged only 25.2c per mile or $13.28 per day. Cleanliness was another point emphasized by F. C. Taylor. Particularly is this true in connection with dairies, where, for sanitary reasons, the horse is automatically pushed out and the gas car cannot occupy its place because of insurance cost, leaving the field for the electric as in the case of bakeries.

Second Electric Vehicle Session

The second and final electric vehicle session, with E. S. Mansfield presiding, was held Wednesday afternoon. Three papers were presented. One dealing with "A Message from Electric Vehicle Users," was read by George B. Foster, Chicago; one on "The Proper Application of the Electric Vehicle," by F. F. Sampson, New York, and a paper on "Electric Industrial Trucks and Tractors and Their Relations to the Central-Station Load," by E. J. Bartlett.

The meeting was then given over to a general discussion of suggestions for the betterment of the industry. One of the most important matters brought out was the suggestion for a co-operative national advertising campaign to be participated in jointly by manufacturers, central stations and all others interested in the promotion of electric vehicles. This suggestion was offered by Frank C. Reilly, of the Lansden Co., and the incoming administration was asked to give the matter consideration.

George B. Foster, Chicago, suggested that the insurance expert of the association endeavor to secure a differential in liability insurance in favor of electric vehicles. George D. Smith, Orange, N. J., spoke of the rapid development of the electric truck and tractor field, and thought the activities of the manufacturers in this direction were having an effect on the electric for street service. The suggestion was made that manufacturers and central stations co-operate in developing electrical equipment for handling freight at water terminals where the congestion is still a serious problem.

The report of the Nominating Committee was presented and the following were unanimously elected as the Electric Vehicle Section officers for the ensuing year:

George B. Foster, Commonwealth Edison Co., Chicago, chairman.

F. W. Frueauff, New York, vice-chairman.

H. M. Edwards, New York Edison Co., treasurer.
A. Jackson Marshall, New York, secretary.
The Executive Committee chosen for three years to fill expiring terms consists of Walter H. Johnson, Philadelphia; Frank W. Smith, New York; E. H. Mansfield, Boston, and C. K. Chapin, Memphis, Tenn.

Accounting Sessions

First Accounting Session.

The accounting session opened on Tuesday afternoon with a large attendance, Chairman Samuel Insull presiding. The chairman's address was presented by Paul R. Jones, New York, and emphasized the disruptive effects of the war upon committee work and the importance of closer relations between accountants and operating men. It was suggested that a member of the National Association of Railway and Public Utility Commissioners be invited on classification of accounts and relations with other associations. Committees were then appointed to nominate officers for next year and prepare resolutions upon the death of L. M. Wallace, auditor of the Boston Edison Co. H. M. Edwards, New York, was chairman of each.

The reports of the Committee on the Uniform Classification of Accounts, presented by Chairman William Schmidt, Jr., Baltimore, recommended securing a standard classification of accounts acceptable to the public utility commission. The report described difficulties experienced in handling the fixed capital account along the lines at present ordered by the commission and recommended a plant investment substitute for property dating before the adoption of the N. E. L. A. standard system, with subaccounts covering later property changes. The report was discussed by S. B. Cushing and S. J. Palmer, Chicago; I. E. Davis, Williamsport, Pa.; E. C. Scobell, Rochester, N. Y.; W. C. Bingham, Buffalo, and H. M. Edwards, New York. The difficulties of accounting for plant items from the history standpoint were generally recognized by all parties concerned.

H. E. Addenbrooke, Chicago, presented the report of the Committee on Accounting Rulings. The committee notes contradictory rulings on the cost of issuing bonds, etc., and urges giving more study to depreciation, especially since the U. S. internal revenue department recognizes its importance. The handling of reserves was stated to be worthy of further investigation.

The report of the Committee on Accounting Education, read by Chairman H. B. Lohmeyer, Baltimore, received a warm welcome. The authoritative character of the available courses was shown, these having been written especially for the electrical utility industry by experts. Douglass Burnett, Baltimore, in discussion, urged that these courses be brought home to employes. H. M. Edwards and P. R. Jones also expressed their appreciation of the work.

Franklin L. Hall, editor accounting section, read the report of the Committee on Accounting Service to member companies, which described the inquiries handled, the results in specific instances and the facilities available. The committee recommended that a special representative be employed to serve the smaller member companies along accounting standardization lines. A large number of speakers discussed the report. The smaller companies were asked to submit criticisms of the N. E. L. A. classification, but little advertisement was forthcoming. It was felt that the spread of accounting education would facilitate standardization. W. A. Jones, Joplin, Mo., volunteered to attend the June convention of the Iowa Section to assist in standardization.

"The Importance of an Efficient Accounting System to a Business," a paper by W. B. S. Winans of Henry L. Doherty and Co., New York, voiced the economic need of accounting in the transition era of the present and urged accountants to take a professional view of their work and advised employers to recognize the real worth and true efficiency of proper accounting with adequate reward of valuable achievement. The paper cautioned employers against false economics and misrepresentations of the work of their accounting departments.

An informal discussion of bonus systems for office employees by Messrs. Scobell, Edwards, Addenbrooks and Lohmeyer closed the session. It appeared that where these systems are installed the amount and quality of work increase and penalties are usually deducted from the compensation for poor work or errors. The bonus system can be applied to billing, meter reading and bill deliveries.

Second Accounting Session.

The second and final accounting session was held Wednesday, with the report of the Committee on Operating Records, C. A. White of Boston, Chairman, first on the program. This report discussed a comprehensive set of forms based on a standard system of accounts to fit the needs of the transportation departments, and was discussed by P. A. Snow, Detroit, E. J. Fowler, Chicago, and H. T. Hughes of Denver, and was highly endorsed as being of special value to the smaller companies. An address on "Motor Transportation in the U. S. Army," by H. B. Lohmeyer, Baltimore, late Captain in the Motor Transport Corps, U. S. A., was then presented.

The report of the Committee on Purchasing and Store Room Accounting was presented by W. F. Stevens, Boston, chairman of the committee. This report was discussed by E. J. Fowler of Chicago, who emphasized the importance of bringing complaints to the attention of the accounting department. He advocated the use of mechanically billing devices, pointing out that these are used to handle the 350,000 monthly bills of the Commonwealth Edison Co. with economy and success.

The report of the Committee on Customers' Records and Billing Methods was presented by P. C. Schlegel, New York, chairman. The concluding paper dealt with "The Establishment and Growth of the Ordnance Finance Section of the U. S. Army During the War," by Col. P. A. Gidney of Boston. This described the establishment and growth of the finance section and dealt in some detail with work done.

The election of officers for the ensuing year resulted as follows: R. W. Symes, Detroit, chairman; J. C. VanDuyne, Brooklyn, vice-chairman; C. E. Calder, Dallas, Texas, treasurer; Frederick Smith, New York, N. Y., secretary, and an executive committee comprising E. J. Fowler, F. H. Hall, William Schmidt, W. E. Long, G. M. Guilford, R. Hughes and William Buchsbaum.

Company Section and Power Sales Bureau Dinners—Entertainments

Company Section Committee's Dinner.

The dinner given by the Company Sections Committee of the N. E. L. A. was held at the Hotel Traymore on Wednesday evening. Frank A. Birch, Philadelphia Electric Co., chairman of the committee, presided. About 45 plates were served. Before introducing the speakers, Mr. Birch gave a brief review of the organization of the Company Sections Committee, which was organized after the observation was made at the Philadelphia convention in 1914, that the association would profit by such a suborganization. The committee was appointed by the Executive Committee of the N. E. L. A. in the autumn of 1914. Several active sections are in existence at present and others are being organized. The general purpose of the company Sections Committee is educational, the idea being to increase the knowledge of the general public about the affairs of electric service companies by letting employes know just what the companies are doing.

The three principal speakers were W. F. Wells, W. C. L. Eglin and Henry L. Doherty. Messrs. Wells and Eglin, who made only brief remarks, were followed by Mr. Doherty.

The remarks of Mr. Doherty emphasized the value of the Company Sections Committee. These sections are the link between the service companies themselves and the general public. The hostile attitude of the public towards corporations is largely the result of ignorance about the affairs of the corporations. A business philanthropist is one who sells service for less than it is worth but far more than it costs. Any application of electricity that reduces the amount of manual labor to accomplish an end is a benefaction: such applications, it was explained, always reduce costs to the consumers.

Mr. Doherty also mentioned the fact that this committee is the school from which the future executives are to be drawn, because through their work in the sections the young men will have an opportunity to show their ability to the executives. The men who are enthusiastic over the Sections Committee work will be enthusiastic about their company work. An enthusiastic worker always inspires confidence in an executive and takes pride in his work. Several short addresses in appreciation of Mr. Doherty's address were made by those present.

Interesting Papers Feature of Power Sales Bureau Dinner.

The dinner given by the Power Sales Bureau at 6:30 p. m., Wednesday in the Rose Room of the Hotel Traymore was more than a get-together dinner of power engineers and salesmen, in fact, no more than was the dinner itself disposed of when the gathering was turned into what was practically a strenuous technical session. The subject of electric welding was the first topic taken up.

F. M. Farmer, Electrical Testing Laboratories, New York, discussed the various phases of electric arc welding, describing the differences between the carbon arc and the metal arc and the use of alternating versus direct-current. He believes that either current is equally satisfactory and that the efficiency of the work is entirely determined by the ability of the workmen. Mr. Farmer stated that a Research Committee had been formed by the Emergency Fleet Corporation to consider the use of electric arc welding in place of riveting for building the hulls of ships on account of the increased speed in production that could be made. This committee had taken the question up with Lloyds in reference to insurance for ships so constructed, and Lloyds had agreed to permit electric arc welding for minor work, but had not yet determined whether they would care to insure a ship whose entire hull was so constructed, as they were not sure of the flexibility of such a construction to stand strains. However, at the time the armistice was signed the Emergency Fleet Corporation had decided to build a 9000-ton ship whose hull was to be entirely arc-welded. Mr. Farmer further stated that he felt sure in a comparatively short time the structural steel work of large buildings would be electrically arc-welded in place of the present method of riveting, the determining factor which has not yet been settled being the flexibility of the joint.

E. J. Bartlett, Cleveland, Ohio, read an interesting paper on "Electric Industrial Trucks and Tractors and Their Relation to the Central-Station Load," outlining the possibilities of this type of equipment in large industrial plants, stating that approximately 8000 machines of all types were in use at present, and that the production of these trucks and tractors was now about 5000 per year. Something like twelve companies are now in the field building this equipment, half of which companies are just really starting. Mr. Bartlett gave a description of the various types of trucks and made the statement that each machine will replace on the average approximately ten men. He strongly urged that the new business departments of central stations get into close touch with the manufacturers of this apparatus. He also gave credit to the battery manufacturers for the work they have done in promoting this field of the industry.

On account of the lateness of the hour, there was no opportunity for a discussion of Mr. Bartlett's paper.

Other Entertainment Features.

The first of the principal entertainment features, the presidential reception, was held in the ballroom of the Million Dollar Pier on Monday evening. As at the previous conventions, this reception was a very brilliant affair and was followed by dancing.

On Tuesday and Wednesday, between 12:30 and 1:30 p. m., a practical demonstration of wireless telephone communication was held between land and airplanes at the end of the Steel Pier. This demonstration was given under the auspices of the Second Pan-American Aeronautical Convention and Exhibition, which was being held at this time. An aeronautical exhibition was also conducted by this association for the benefit of the attendants of the convention on Wednesday afternoon.

On Tuesday evening, following the public policy session, at which many ladies were present, another dance was held in the ballroom of the pier.

The final entertainment feature was a carnival and ball which was also held in the ballroom of the pier. In connection with this, an elaborate illumination spectacle, called "A Vision in the Desert," was presented.

In order that the ladies and other guests might enjoy themselves while the members were busy at the various convention sessions, a number of other entertainment features were provided. Among the most

important of these was the musicale and tea held for the ladies on Tuesday afternoon in the ballroom.

In addition to these entertainment features which were provided for the guests and ladies as well as the members, several dinners and banquets were held by the different branches of the industry represented at the convention. The most important of these were the Company Sections dinner and the Power Sales Bureau dinner held in the Hotel Traymore on Wednesday evening which have already been mentioned.

Promising Outlook for Central-Station Industrial Power

By C. J. RUSSELL

Chairman, Commercial Section, N. E. L. A.

THE most attractive field for constructive sales efforts at the present time is undoubtedly that of central-station industrial power. The reasons why this outlook is so promising may be found in prevailing economic conditions and they are supported by fundamental facts which are both important and logical in their bearing on the subject.

C. J. Russell.

We are all impressed by the necessity of immediate organization for the manufacture of economic goods upon a larger scale than ever before. We also know that we must perfect methods of transportation to reach the markets of the world with our products to the value of many billions of dollars, if we are to continue our present commercial supremacy.

It is a well established fact—possibly better understood abroad than here—that our industrial success has been built upon the use of power to a greater extent per person than is used in any other country. It is also true that our industry has progressed just as the amount of power used per person has increased and that our greatest strides in output have been due to the electrification of our industries. In other words, the greater the amount of electrical energy used in an industry per dollar expended for labor, the greater the output and financial turnover has been.

The economic value of power supply from a central source, so strongly recognized by this Government during the war, has given new impetus to the central-station business and has been enhanced by the mounting costs of the generation of energy in small isolated plants.

If the present level of wages is to be maintained in the face of foreign competition, it can only be done through the increased production of goods. That means increased efficiency is necessary, but it also means that human labor must be augmented by more motive power. Human labor must represent a smaller and applied power a larger item in the total cost of making and handling a given product, if we are to hold our industrial supremacy.

Consideration of these facts can lead to but one conclusion, namely, the central station faces the greatest opportunity in all history for the expansion of the power business. This conclusion is, moreover, driven home by the present very active inquiries for power to modernize and increase the capacity of existing factories as well as for power to supply new undertakings.

It is of the utmost importance that these opportunities should be met properly so as to fulfill the economic necessities of the situation. Our commercial engineering responsibility in this respect is great, for the industrial success of the nation will depend upon our service. Ample power must be provided and machine speeds—the life of output—must be the highest possible.

The associated lighting requirements, that mean so much as far as safety and product are concerned, must be handled correctly in order to maintain output when artificial light is necessary. Every possible power adjunct that can add to the effectiveness of human labor must be presented to the attention of our prospects.

The present outlook shows more than opportunity—it shows duty and responsibility.

Exhibits at N. E. L. A. Convention Attract Much Attention

Intensely Interesting Displays by the Lamp Committee and by Many Manufacturers Show Electrical Developments of Last Three Years—List of Exhibitors—Meeting of Class D Members

Through the painstaking efforts of the Exhibition Committee, a wonderful array of important exhibits was presented at the Atlantic City convention of the National Electric Light Association this week. The exhibition was opened on Monday morning, May 19, and up to the close of the convention on Thursday afternoon was crowded by throngs of interested convention delegates.

What struck even the casual observer was the very attractive arrangement of all the exhibits, which impressed one because the exhibition was to be open for only four days. The number of exhibitors was also said to be much greater than at any preceding N. E. L. A. convention, this being due, doubtless, to the desire of manufacturers to show three years' development in their products.

Some Notes on the Exhibition.

In the following notes on the exhibits no attempt has been made at completeness, since to do full justice to all the exhibits would take ten or more pages. These notes are observations, made by a disinterested spectator, on what seemed to be particularly striking and new developments in electrical appliances and apparatus.

Conspicuously arranged in the exhibition hall was the display of the Lamp Committee and the Lighting Sales Bureau in co-operation with lamp manufacturers. It showed the "New Spirit of Lighting." The development of lighting as a pure science was illustrated by the large variety of lighting devices. A characteristic of the devices was the fact that they represented the results of the co-ordination of theoretical ideas and experimental data. Diffusers were designed to eliminate glare by the proper shape and character of diffusing surfaces and were arranged so that the distance between the diffusing surface and source of light was most advantageous. Various kinds of reflecting and diffusing surfaces were exhibited to accomplish the two great ends for proper lighting, namely, uniformity of distribution and absence of glare. All apparatus exhibited showed not only the vast improvement that has occurred in lighting equipment in recent years, but also the tremendous amount of expense and thought that has been expended by the manufacturers. The various lighting systems that were installed in the different booths exhibited the advantages to be obtained by the use of modern equipment. These advantages were shown by comparing scientifically designed lighting systems with those that are arranged with no thought of obtaining equal distribution and absence of glare. The trend of all of the new equipment is toward simplicity of design and of operation. The idea is evidently gaining ground that lighting equipment should be so built as to make frequent cleaning and other maintenance easy and inexpensive.

Simplicity of design for the purpose of easy and quick erection for new installations, as for repair work, is also a feature of the line equipment displayed. This feature was shown in a reduction of the number of parts and in the scientific selection of the material for those parts that are included in the fixtures. The use of numerous specially constructed and threaded couplings for connections between insulators for high-tension circuits is being avoided by the use of standard pipe unions. The use of specially adapted alloys instead of the less suitable and less expensive kinds are being adopted for soldering electrodes to porcelain. One manufacturer exhibited a new cutout base with a reduction in the number of parts that reduces the number of stock sizes by 35%. Simplifying the design of the cutout permits the dealer to carry a smaller stock and permits the lineman or repairman to accomplish more in a day than he could accomplish if he were installing more complicated apparatus.

That the manufacturers have kept in mind the safety of workers as well as simplicity and economy of design of their equipment was apparent in all of the exhibits. A characteristic of all of the apparatus was the unusual display of safety devices and precautionary accessories. These devices are so cleverly and carefully constructed that the workman can receive an injury while working with live equipment only by making a deliberate effort to do something not required of him. Such construction of equipment represents a decided improvement over the construction of the very recent past when the equipment was such that the employe had to take unusual precautions to protect himself.

The principle by which an impulse gap assists arresters to give protection from high-frequency disturbances held attention among the varied activities of the Westinghouse operating exhibit. The gap was for a standard 33,000-volt set having selective properties sensitive at high frequency. It will discharge a high-frequency line disturbance at a voltage considerably less than its 60-cycle discharge voltage. In the demonstration a high-frequency voltage was applied to the impulse gap, having a wave front of about 600,000 cycles and a plain spherical horn gap was connected in parallel with the impulse gap. The impulse gap was set for 60-cycle discharge voltage, more than 50% higher than the plain sphere horn gap, while their discharge voltages for high-frequency impulses were about equal, as indicated by the fact that sometimes one and sometimes the other took the discharge when the high-frequency impulse voltage was applied. The original paper on this subject was presented by Chester T. Allcutt before the May, 1918, meeting of the A. I. E. E.

Labor-saving, utilitarian features were prominent in a new dishwasher shown by the Western Electric Co. In the first place, it combines a dishwasher and kitchen table in a single unit—a space economy very valuable when the passing of the old time "roomy" kitchen is taken into consideration. The dishes are

arranged in wire trays in a large compartment. One kettleful of hot suds is splashed over them by an electrically operated agitation; the hot suds are then drained direct to the sewer connection and a tea kettle of hot, clear water follows; the dishes are then clean and dry off inside the compartment where they may be left until the next meal.

The possibility of maintaining at all times a dry temperature below 50° F. and at the same time making sufficient ice for table purposes is attractive to the householder. The first showing of the new Isko machine for this purpose was made at the convention, the latest design of the Isko Co., Chicago. The gas SO_2 is charged into the machine at the factory. It is sealed in and passes from liquid to gas, gas to vapor, and vapor back to liquid in a continuous cycle without waste. The only moving parts, beyond the motor, are two small gears, which take the place of reciprocating pumps. The range of sizes goes beyond those for household purposes, the sizes adapted to hotel and similar service being equivalent, respectively, it is said, to refrigeration obtained from 200 lb., 400 lb., one ton and two tons of ice.

A new electric radiant heater will be ready for September sales—the No. 99 Simplex. It is as scientifically designed as the most modern searchlight. Standing 20 ft. away from the parabolic reflector, one is still under the influence of a comfortable glow. The whole unit is about the size of a 12-in. electric fan and the heating unit, located at the focus of the reflector, takes only 600 watts.

Among the many things economical of space and operation developed during the war, but not pushed until the present time, may be mentioned the "Air occluder" of the Alberger Pump & Condenser Co. This is a new type of vacuum pump, if the term pump may be applied to a device without moving parts. Aside from economy of operation, when used in connection with condensing equipment for steam turbines, a most noticeable feature is the very small space which it occupies as compared with the usual vacuum pump. Considering the very limited space generally available for the condensing equipment, if the real space economy of the steam-turbine unit is to be utilized to the utmost, this is a very valuable feature.

Special attention to labor-saving features has been given to some new line-material designs of the B. & K. Manufacturing Co., New Britain, Conn. In a new friction clamp, for instance, one key bolt takes the place of the three bolts usually employed in clamps for a similar purpose. The "Holdem," as it is called, for dead-ending wires is fitted with a form of sister hook that can be attached in a moment. These and other devices in the "EZ" line are all designed to save a few minutes of the lineman's time.

A vacuum cleaner capable of maintaining a vacuum of 16 in. of water is certainly supplied with sufficient capacity for ordinary purposes. The new sweeper of the Pneuvac Co., Worcester, Mass., is claimed to do this. Moreover, it is so designed that this powerful suction cannot draw the carpet up with the nozzle. While it is a combination suction and brush sweeper, the latter may be disconnected in a moment. The transmission is a combination of a fiber gear and brass worm, the former acting as a sort of safety valve in case of severe overload, for the gear will strip before the motor will become stalled.

A new star-delta switch that will open and close both motor and main-line switches simultaneously and in one operation is a new development of the Wadsworth Manufacturing Co., Covington, Ky. The safety feature is the most appealing feature of the device.

Someone conceived the idea that a household washing outfit could be built exactly along the lines of steam-laundry equipment. The idea has been worked out by the Marlow Manufacturing Co., Cleveland, Ohio. It was announced less than a month ago. The clothes are washed by the universally satisfactory cylinder method and then dried, ready for ironing by extraction; the cylinder, having a capacity of 12 sheets, makes 35 r.p.m.; the extractor runs at 1500 r.p.m. At this speed it takes out all the water in 3 to 5 minutes. the operation being performed at the same time that another batch is being washed.

List of Exhibitors and Their Exhibits

Alberger Pump & Condenser Co., New York—Air occluder for surface and jet condenser pumps, steam turbines.

Allis-Chalmers Manufacturing Co., Milwaukee, Wis.—Generators, turbines, motors, rotaries.

American Conduit Manufacturing Co., Pittsburgh, Pa.—Metal molding and fixtures for interior wiring.

American Electrical Heater Co., Detroit, Mich.—Electrically heated and operated electric ironing machine, heating apparatus.

American Ironing Machine Co., Chicago.—Electric ironers.

Americolite Co., New York.—Commercial lighting unit for stores and offices.

Albert & J. M. Anderson Manufacturing Co., Boston, Mass.—Charging plugs and receptacles, connectors, reverse-current relay, time switch, motor-starting switches.

Apex Electrical Distributing Co., Cleveland, Ohio.—Electric washing machines, electric vacuum cleaners.

Baker R. & L. Co., Cleveland, Ohio.—Electric passenger vehicle, industrial trucks and tractors.

J. B. Beans, Philadelphia.—Christmas advertising display, electric revolving window signs.

Borne-Scrymser Co., New York.—Turbine and transformer.

B. & K. Manufacturing Co., New Britain, Conn.—Pole-line hardware, portable lamps, low-tension wire holders.

Central Electric Co., Chicago.—Maxolite reflectors and diffusers for factory lighting, industrial lighting equipment, high-capacity portable receptacles and Ralco plugs.

Coffield Motor Washer Co., Dayton, Ohio.—Electric washing machines and wringers.

Commercial Truck Co. of America, Philadelphia.—Electric trucks, chassis, power unit, revolving rear axle.

George Cutter Co., South Bend, Ind.—Street-lighting units, industrial-lighting fixtures, high-tension switches.

Delta-Star Electric Co., Chicago.—Outdoor substation equipment, lightning arresters, disconnecting switches, choke coils, busbar supports, bus spacers.

Detroit Stove Works, Detroit, Mich.—Electric ranges.

Duplex Lighting Works of General Electric Co., New York.—Lighting units.

Edison Electric Appliance Co., Chicago.—Ranges, domestic appliances, sewing machines, heavy-duty cooking equipment, water heaters.

Edison Storage Battery Co., Orange, N. J.—Storage batteries.

Electric Service Supplies Co., Philadelphia.—Floodlights, marine searchlights, high-tension line equipment, lightning arresters, railway supplies.

Electric Storage Battery Co., Philadelphia.—Storage batteries.

Electric Vacuum Cleaner Co., Cleveland, Ohio.—Vacuum cleaners and accessories.

Electrical Testing Laboratories, New York.—Samples of apparatus and materials for test.

Elliott-Fisher Co., Harrisburg, Pa.—Accounting, bookkeeping, billing and recording machines.

Eureka Vacuum Cleaner Co., Detroit, Mich.—Vacuum cleaners.

Federal Sign System (Electric), Chicago.—Electric washing machines, electric sirens, fuses, vacuum cleaners, signs.

General Electric Co., Schenectady, N. Y.—Helps to retailers, master clocks.

Grether Fire Equipment Co., Dayton, Ohio.—Portable electric searchlamps.

G. & W. Electric Specialty Co., Chicago.—Disconnecting potheads, underground boxes, model of distributing system.

Hoover Suction Sweeper Co., North Canton, Ohio.—Electric suction sweepers, Hoover house.

Hubbard & Co., Pittsburgh, Pa.—Pole-line hardware, low-tension distribution attachments, pressed-steel wire holders, brackets, racks, lightning arrester.

Hurley Machine Co., Chicago.—Washing machines, vacuum cleaners, ironers.

Independent Lamp & Wire Co., New York.—Lamps of all types, including automobile, street and miniature.

International Time Recording Co., New York.—Electrically and mechanically operated time-recording systems, card recorders, dial recorders, cost-keeping machines and time stamps.

Interstate Electric Novelty Co., Brooklyn, N. Y.—Flashlights, flashlight batteries, Christmas-tree outfits and dry cells.

Irving Iron Works Co., Long Island City, N. Y.—Safety steps, fireproof ventilating flooring, grating flooring.

The Isko Co., Chicago.—Electric refrigerating machines.

Jeffery-Dewitt Insulator Co., Huntington, W. Va.—High-tension insulators.

H. W. Johns-Manville Co., New York.—Fuses and Acebony asbestos wood, fire extinguishers, molded insulations, fiber conduit.

Landers, Frary & Clark, New Britain, Conn.—Domestic heating and cooking appliances.

The Lansden Co., New York.—Electric trucks.

Leeds & Northrup Co., Philadelphia.—Electrical pyrometers and photometric instruments.

Lundin Electric & Machine Co., Boston, Mass.—Fault locater for overhead and underground cable systems.

Marlow Manufacturing Co., Cleveland, Ohio.—Combination washing and water-extracting machine.

Metropolitan Engineering Co., Brooklyn, N. Y.—Enclosed meter-protective and testing equipment.

Moloney Electric Co., St. Louis, Mo.—Transformers.

National Lamp Works of General Electric Co., Cleveland, Ohio.—Lamps, instruments.

Naugle Pole & Tie Co., Chicago.—Treated western red cedar poles.

New Home Sewing Machine Co., Orange, Mass.—Electric sewing machine.

Ohio Brass Co., Mansfield, Ohio.—High-tension insulators.

Packard Electric Co., Warren, Ohio.—Transformers, automotive cables.

Philadelphia Electric Co. Supply Department, Philadelphia.—High-tension apparatus, meter supplies.

Philadelphia Electrical Manufacturing Co., Philadelphia.—Series street-lighting equipment, high-tension equipment.

Pittsburgh Transformer Co., Pittsburgh, Pa.—Transformers.

Pneuvac Co., Worcester, Mass.—Electric sweeper.

Railway & Industrial Engineering Co., Greensburg, Pa.—Lightning arrester, remote-control switches, outdoor substations, choke coils.

Rathbone Sard Electric Co., Albany, N. Y.—Electric ranges.

Remmert Manufacturing Co., Belleville, Ill.—Electric washer.

Rumsey Electric Co., Philadelphia.—Electrical suppljes, domestic heating and cooking appliances, ranges, dishwashers, pole-line brackets, fans, radiant heaters, meters.

Safety Meter Box Co., Cleveland, Ohio.—Meter protector.

Sangamo Electric Co., Springfield, Ill.—Direct-current and alternating-current watt-hour meters, ampere-hour meters, shunts, instrument transformers.

Shapiro & Aronson, New York.—Lighting fixtures, commercial lighting unit, portables.

Shelton Electric Co., New York.—Electric vibrator, hair drier and phonograph motor.

Simplex Electric Heating Co., Cambridge, Mass.—Electric domestic heating and cooking appliances, heavy-duty electric ranges.

Snead Co. Iron Works, Jersey City, N. J.—Portable electric lamp.

Square D Co., Detroit, Mich.—Meter protective and testing devices, safety switches.

Tabulating Machine Co., New York.—Tabulating and sorting machines.

Templeton, Kenly & Co., Chicago.—Pole-straightening and pulling jacks, car, industrial, track and motor-car jacks.

Trumbull Electric Manufacturing Co., Plainville, Conn.—Meter protective switches, safety switches, knife switches.

Volk Manufacturing Co., Westport, Conn.—Cartridge and knife fuse blocks.

Wadsworth Electric Manufacturing Co., Covington, Ky.—Safety switches, meter protective devices.

Wagner Electric Manufacturing Company, St. Louis, Mo.

Walker Vehicle Co., Chicago.—Electric trucks.

Ward Motor Vehicle Co., Mount Vernon, N. Y.—Electric delivery wagon, electric trucks.

Western Electric Co., New York.—Sewing machines, washing machines, vacuum cleaners, dishwasher, heat regulators.

C. H. Wheeler Manufacturing Co., Philadelphia.—Air ejector with surface condenser between stages.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.—Automatic substations, impulse-gap lightning arrester, induction regulator, turbine-generators, domestic heating appliances, industrial motors, insulators, high-tension equipment, fans, safety switches.

The Okonite Co., New York, for which Central Electric Co., Chicago, is general western agent, had its headquarters with the Central Electric Co., showing samples of wires and cables: the Okonite representatives were I. D. Underhill, C. A. Miller, J. W. Hackett and W. R. Vansteenburg.

Meeting of Class D Members

The annual meeting of Class D members was held on the pier Wednesday forenoon, May 21, James W. Perry, chairman of the Exhibition Committee, presiding, and H. G. McConnaughy acting as secretary.

The Exhibition Committee was complimented by several of the exhibitors for the well arranged and attractive exhibits and for the courtesies and assistance extended by the officials. The secretary stated that the number of exhibitors exceeded any former N. E. L. A. exhibition by 100%. Treasurer F. H. Gale reported the finances of the committee in good condition, to be reported on in detail through the association's bulletins.

On motion of J. C. McQuiston, a resolution of thanks and appreciation was extended to President Wells of the association and his Executive Committee for the great assistance given to the exhibition management.

Chairman Perry appointed a Committee on Nominations, consisting of Charles W. Price, chairman, F. D. Killion and A. E. Clifford, stating that as there had been no elections during the period of the war an entire Exhibition Committee would have to be elected. The committee recommended the following named and they were unanimously elected:

For one year: J. C. McQuiston, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.; George A. Hughes, Edison Electric Appliance Co., Chicago; Gaylord A. Freeman, Walker Vehicle Co., Chicago.

For two years: C. L. Peirce, Jr., Hubbard & Co., Pittsburgh, Pa.; S. E. Doane, National Lamp Works of General Electric Co., Cleveland; F. H. Gale, General Electric Co., Schenectady, N. Y.

For three years: Charles Blizard, Electric Storage Battery Co., Philadelphia; John Mustard, Wagner Electric Manufacturing Co., Philadelphia; James W. Perry, H. W. Johns-Manville Co., New York.

Abstracts of N. E. L. A. Committee Reports and Papers

Brief Digest of the Numerous Reports Presented at the Annual Convention of the National Electric Light Association, Atlantic City, on May 20 to 22

General Sessions

Report of Insurance Expert.

By W. H. Blood, Jr.

Mr. Blood explained how the biennial revisions of the National Electrical Code, called for representation of the N. E. L. A. on the committee in charge so that no rules be adopted that would retard the development of the central-station industry. Mr. Blood was appointed insurance expert of the association about ten years ago and has continued to represent it in the matter of code revisions as well as many other features bearing on insurance and electrical hazards. He explained the new procedure of the Electrical Committee in charge of the National Electrical Code and pointed out its advantages. (See ELECTRICAL REVIEW, March 15, 1919.) He has also been called on to aid in the defense of suits brought against member companies for damages alleged to be due to electrical fires, etc., caused by central-station service. He instructs the defending attorneys on electrical matters and on the kind of evidence necessary; he assists in determining the real cause of the fire and often acts as expert witness. In no suit in which he has participated has the defense lost its case.

Report of Committee on Sale of Company Securities to Customers and Resident Citizens.

W. H. Hodge, Chairman.

Although this committee has been in existence but a few months, it presented a 45-page report in which the advantages of customer ownership are pointed out and the whole subject of the local sale of utility securities is discussed from many angles. The aims sought in the sale of securities to utility customers are: Ownership to a considerable extent by a large number of customers; retaining of skilled management, efficiency of private ownership, progressiveness and resourcefulness of private initiative; freedom from adverse public opinion. Recognizing these objects as of much value, from 50 to 100 central-station companies have sought, since 1913, to interest their customers and resident citizens in their securities. Reports from 48 of these companies show sales within the last few years of $27,134,057 of preferred stock, $3,862,500 of common stock, $2,294,000 of bonds, $6,724,600 of short-term notes—a total of $40,015,157 of central-station securities.

These figures were derived through a questionnaire sent out by the committee, to which 256 companies replied; of this total 208 had as yet done nothing in this line, but 45 of the latter companies are deeply interested in the proposition and contemplate action. Only two companies reported discouraging experiences. The 48 companies reporting favorably are scattered in all parts of the country.

In a general discussion of the matter, the committee shows that customer ownership occupies a middle ground between private ownership and operation and public or municipal ownership and operation. It aims to combine the beneficial features of each. It replaces the old custom of exclusiveness of ownership by a few of the modern ideas of ownership by many. Before undertaking it, it is necessary to study the financing of utilities carefully. From this it is found that the preferred stock is the best kind of utility security to offer to the customers or local public. A definite return and absence of speculative features is what is desired by the average small investor.

Sale of securities to customers should be an aid to utility financing of betterments and extensions, although it can probably not replace all the older financing methods, that is, through banks and special investment houses and sale to existing stock or bondholders. It should facilitate the work of regular investment houses and relieve the banker of selling stock. During the war regular investment agencies found it difficult to sell utility preferred stock except at very low prices. At least 50 utility companies, however, sold upward of $20,000,000, some continuing throughout the war, except during Liberty Loan drives. In most cases this was done in the face of rate increases.

Two principal methods have been followed by utilities in selling their securities locally. The short campaign method, and the continuous selling method. Sometimes the two are combined. Both methods and the combination have proven successful. Choice of method depends on local conditions, but continuous selling requires a special organization. In only a few cases has the local securities sales work been turned over exclusively to the commercial department, but that it can be done is unquestioned, in fact, the committee recommends that it be done whenever practicable.

Supplementing the report proper is a condensed account of home security-sales methods used by 18 central-station companies or groups of companies. Appended also are brief statements from nine executives of these companies as to the methods used, results obtained and the value of the entire scheme. One of these executives says that this "is one of the greatest movements inaugurated as a solution ultimately to the problem of municipal ownership."

Report of Committee on Company Sections.

Frank A. Birch, Chairman.

This report is a very frank review of serious status of the company sections. The war affected company sections perhaps to a greater extent than it did any other department of N. E. L. A. work; 37 sections disbanded; 17 temporarily suspended activities, while but 19 still are active. Only one new section has been

formed in the last two years. The chief reasons for this situation are pointed out.

An amendment to the N. E. L. A. constitution to provide for a limited class of membership in company sections and to afford a more dignified status for Class B members is advocated. The limited members are to be employes of member companies who desire to participate in the section's activities, but who are not yet qualified for Class B membership. The dues from such limited members shall go into the local section treasury.

A large number of active sections is the present need. Former dragnet methods of soliciting membership should be abandoned and association membership should be allowed to stand on its own merits. Tendency to form local employes' clubs should be offset by more liberal provisions for membership in company sections.

Subcommittees for the assistance of company section officials have been organized and are planning important work. An engraved charter which will be sent to both new and old sections is in preparation.

Report of Committee on Constitution and By-Laws.

W. C. L. Eglin, Chairman.

The committee unanimously recommended, at the suggestion of the Committee on Company Sections, an amendment of Article XIV on Company Sections. As amended, it would read:

Section 1.—Upon the application to it by any Class A member, having in its employ not less than ten Class B members, the Executive Committee shall authorize the organization of any or all of the officers and employes of said Class A member into a Company Section of the National Electric Light Association, the officers, Executive Committee and committee chairmen of which shall be elected from the Class B membership.

Section 2.—A Company Section may include as Limited Members those employes of Class A members who desire to participate in the local section's activities, but who are not yet qualified for Class B membership. The dues from such Limited Members shall go into the local section treasury.

The Electric Truck in Modern Transportation.

By E. E. La Schum.

In this paper Mr. La Schum states that sight is sometimes lost of the fact that high efficiency in the business of transportation can only be attained through a most careful analysis and deep consideration of those fundamental problems which must necessarily be solved in order to insure perfect and most economical operation for the longest period of time. Consideration is therefore given in the paper to the most important of these problems with the idea that familiarity with them generally, and a knowledge of their proper application by others, might be of assistance in correcting some transportation difficulties, to wit: Selection of proper motor vehicle equipment; economy, reliability and efficiency of the electric; selection and proper care of batteries; installation of proper charging equipment; safety of the electric vehicle; freedom of the electric from fire hazard; co-operation between truck manufacturer, battery manufacturer and central station.

A recapitulation showing average cost of operating an electric truck in three representative cities of the United States, covering a six-months' period, illustrating the low cost of operating an electric, is also included in this paper.

Report of Committee on Form of Annual Reports to Commissions.

W. J. Meyers, Chairman.

The report relates the failure of an effort to secure the aid of the National Association of Railway and Utility Commissioners in obtaining a reduction of the burdensome requirements of annual report forms prescribed by public service commissions, and gives in detail the resolutions adopted by the Executive Committee of the Accounting Section and sent to the commissions, emphasizing the necessity for relief. It calls attention to the fact that the commissions are much more responsive to representations made by the citizens of their respective states than to those made by representatives of an association composed largely of citizens of other states, and urges that the companies of each state actively interest themselves in this matter if they desire relief.

Report of Lamp Committee.

Frank W. Smith, Chairman.

The chief work done by the committee was gathering the lighting exhibit, which formed probably the chief feature of the exhibition on the pier. During 1918 the total sales of incandescent lamps for domestic use, excluding miniatures, amounted to 186,000,000, of which 89% were tungsten lamps. Gem lamps have been discontinued and carbon lamps are gradually becoming less and less used. Distribution of types and sizes is reported on in some detail. Voltage standardization has made further headway. In lamp developments there was the mill-type tungsten lamp, and incandescent lamps for motion-picture projection. The progress in state industrial lighting codes is reviewed, the foot-candle meter described and the fuel-conservation lamp program of 1918 outlined. Reports on lamp policies received by the committee give the following distribution of the 474 companies reporting: Make free lamp renewals only, 1%; merchandise lamps only, 79%; free renewals and merchandise, 8%; do not handle lamps at all, 12%. This shows a tendency toward merchandising lamps by companies of all sizes. The bulk of the companies that sell lamps do so at list price. Since the merchandising of lamps is increasing, the committee recommends co-operation with local dealers to see that lamps of proper voltage are sold.

Commercial Sessions

Report of Committee on Commercial Service and Relations with Customers.

R. F. Bonsall, Chairman.

This report deals with the practice of various companies in regard to applications, credits, meter reading, collections and complaints and includes some recommendations by the committee. A questionnaire was sent to 75 companies in various sections of the country and replies were received from 38. The questions on applications were designed to show (1) The value of a customer's signature; (2) the advantage of leaving service available on vacant premises; (3) the use of telephone and mail requests for service, and the length of time required to connect service.

The report in considering credit problems includes

information on methods of obtaining credit data, when to require a deposit, when to return it, and exchange of credit information between companies. Meter reading in its details is tabulated, methods of entering customers' premises, use of meter readers during spare time, connections found ahead of meters, etc. The question of collections is considered, the handling of current and delinquent accounts and the practice of disconnecting for non-payment. Complaints are discussed, the adjustment of bills, including grounded and unaccounted for use of service and investigation on customers' premises.

The answers show such a wide difference in methods among the members that the committee recommends the continuation of effort to bring about greater uniformity in the commercial relations of central-station companies with customers. The result of such effort may be at least the nucleus of a handbook on standard practice in this department.

Report of Wiring Committee.

R. S. Hale, Chairman.

The report of the Wiring Committee is devoted to numerous more or less independent subjects which may be listed as follows:

1. *Standardization of Plugs and Receptacles (Socket End of the Cord).*—No report on account of legal situation.

2. *Standardization of Appliance Plugs and Housing (Appliance End of the Cord).*—There is a plug on the market available for use on both flat and round prongs which, if it turns out to be a commercial success, will solve the problem.

3. *Polarity Plugs and Receptacles.*—Watchful waiting, with a recommendation that nothing be done that would interfere with the use of the millions of flatirons and other devices now operated by the customers.

4. *Standardization of the Portable Cord.*—The committee believes that a minimum standard of quality should be arrived at by experience, but that any other standardization would be harmful.

5. *Standardization of Range Connection to Wiring.*—It is believed that any rules on this subject would be harmful and any safe method should be permitted.

6. *Fires from Flatirons, Immersion Heater Elements and Similar Devices.*—The committee recognizes that fires from these are unduly numerous, but reports that rules making any wiring device obligatory for the purpose of reducing these fires would in practice encourage their use off of lamp sockets and would be a danger rule. The committee recommends continued education of the public against carelessness in the use of these appliances.

7. *Concentric Wiring and Other Methods of Wiring.*—Although many of these methods have been proved safe, they are still practically forbidden in this country by interests over which the committee has no control. For this reason the situation is considered very unsatisfactory and disadvantageous to the best interests of the public.

8. *Solid Neutral.*—The committee continues to report that the solid neutral from the generator or transformer to the lamp would be not only cheaper but safer.

9. *Color of Neutral Wire.*—Final action on the previous recommendation in favor of a distinct color for the neutral or grounded wire has been postponed on account of the war. It is hoped that it will soon go into effect.

10. *Size of Wire.*—The committee recommends that No. 18 and No. 16 wire should be permitted when they are safely protected, as well as when they are exposed to mechanical injury. There will be but few cases where this will make any appreciable saving; the chief object of this section of the report is to bring out the fact that when a code for protection against fire or life hazard is made use of to promote other objects, then the result is not increased safety, but instead is increased danger.

11. *Connection Between Inside Wiring and Outside Lines.*—The committee has under consideration what should be done on this subject beyond its 1917 report and will make a recommendation to next year's committee as to a further study of this subject.

12. *National Electrical Code.*—The committee presents a discussion and hopes that the result may be that in the future the Code and its makers will devote more attention to the introduction of new and safe methods. Since rules for wiring were established, the costs of generating and of distributing electricity have been steadily reduced to a fraction of their former amount; but the cost of wiring has, if anything, increased. The committee believes that if wiring rules had permitted and encouraged more development, the result would have been a reduction in wiring costs without any reduction of safety, similar to the reduction in generating and distributing costs that have made possible the growth of the electrical business and have given such great service to the public.

13. *Tests of Wiring.*—The committee believes in basing all rules on experience and tests, and is arranging to record the experience and tests on different methods of wiring at different ages. These records will indicate the items on which data are lacking; and the tests being made under the auspices of the committee, together with such other records as it may be able to present, will in time cover a large field. The third appendix to the report explains more fully the plans for the reporting of the tests. The other two appendices give some very valuable data on rubber covered *vs.* slow-burning wire.

Report of Committee on Education.

Fred R. Jenkins, Chairman.

During the past two years, notwithstanding the abnormal business conditions, the committee has continued the courses in commercial engineering and practical electricity, and has maintained them on a self-supporting basis. The continuance of these courses was considered necessary for two reasons, first, the committee had accepted payment in advance for complete courses, and felt obligated to carry out its contract; second, it believed that in such times as these, when the organizations of member companies were seriously impaired by enlistments and draft, these courses, especially prepared for the education and training of new employes, would be extremely valuable, and that they should be used for the training of new employes to take over the work of those who had been called into the service. Member companies and their employes showed a renewed interest after the ending of the war, indicating that they considered them of value during the present reconstruction period.

In conducting a campaign starting Feb. 1 the committees of the Commercial and Accounting Sections combined to avoid the annoyance and difficulty of two separate campaigns. They were thus enabled to divide the territory among a larger number of committee men, reducing the cost to both sections on special campaign literature, such as posters, pay envelope slips,

etc. Where the companies have used these pay-envelope slips, the results have been very satisfactory and it would appear that if the member companies would adopt this co-operative method, the courses would receive the support to which they are entitled.

It is recommended that a similar campaign be conducted next September, combining both Commercial and Accounting Section Committees on Education, furnishing without charge both posters and pay-envelope slips with the name of the company and its representative thereon. It is urged that each member company adopt these courses in rebuilding its present impaired organization into a permanent organization.

Report of Committee on Electrical Salesman's Handbook.

R. H. Tillman, Chairman.

The committee reports suggestions as to the circulation of Handbooks, and the formation and work of the Handbook Committee in the future, as contained in its 1917 report. A list of new material in the form of monographs is suggested for insertion in the handbook as soon after the convention as time will permit, these monographs to cover subjects of special interest to the electrical salesman which are listed in the report. Manufacturers' sheets are not to be included as an integral part of the handbook, but are printed in size, form, etc., to fit the handbook and used as the salesman desires. The committee calls attention to the increased cost of the handbook and the fact that the stock of the present edition has been exhausted. It points out a way to continue the circulation in its present loose-leaf form at a reduced cost per member.

Report of Committee on Co-ordinate Advertising and Sales Campaigns.

Henry Harris, Chairman.

After a careful review of the subject of advertising the committee believes that the method of large department stores in advertising "leaders" to attract people to the stores offers many advantages to the electrical interests. The advertising of such leaders nationally with simultaneous window displays and local advertising it is thought will stimulate interest in things electrical and bring people to the stores. Accordingly two monthly schedules were drawn up, one for electrical mechandising and the other for lighting. These schedules should be followed as closely as possible by the various branches of the industry in their advertising for that month. The first of these schedules was submitted in 1917 and has been quite freely adopted. However, it has since been found advisable to make some slight modifications in the schedule and a new schedule containing these was included in the report. The new merchandising schedule is as follows: Jan., clearing sale; Feb., heating pads; March, vacuum cleaners; April, sewing machines and sewing machine motors; May, grills; June, irons; July, fans; Aug., clearance sale; Sept., washing machines; Oct., radiant heaters; Nov., toasters; Dec., electrical christmas gifts.

The following lighting schedule has also been arranged: Jan., better lighting; Feb., outdoor lighting (tennis courts, playgrounds, etc.); March, stores and windows; April, residence; May, electrical advertising (signs, outline lighting, display lighting, etc.); June, public buildings; July, industrial; Aug., stores and windows; Sept., electrical advertising (signs, outline lighting, display lighting, etc.); Oct., residence; Nov., better lighting (with emphasis on office buildings); Dec., industrial.

A monthly reminder will be sent to the member companies six or eight weeks in advance of each monthly special sale or drive provided by these schedules, and the complete schedules will be printed on the back of each reminder so that they will always be easily available. It is proposed to list on these monthly reminders the companies which supply advertising matter on the appliances or devices appearing on the schedule. Only manufacturers, however, who are members of the National Electric Light Association will be listed.

Report of Committee on Publications.

F. D. Pembleton, Chairman.

The committee carefully considered many of the Commercial Section's former publications and recommended the issuing of 500,000 copies of a Christmas folder or house-wiring book entitled, "The Right Way to Use Appliances." A publicity campaign on central-station service was strongly recommended, but referred back to the Commercial Section for further action. The committee recommended that its name be changed to "Publicity Committee." To avoid duplication of effort and expense by manufacturers and central stations in the matter of publications on lighting, the manufacturers were asked as to a co-operative arrangement that would make it unnecessary for the committee to publish booklets on this subject; the manufacturers declined to participate.

The folder on the right use of appliances is at the suggestion of the National Board of Fire Underwriters. It is planned to put one of these folders in each package containing an appliance sold to a customer. Appliance manufacturers are to be asked to put a tag or leaflet in each package explaining the right way to use the appliance.

Report of Merchandising Committee.

E. R. Davenport, Chairman.

The committee was of the opinion that the report as presented in 1915 should represent a textbook on merchandising electrical goods, and recommended that the incoming and successive committees from year to year use it as a foundation to be improved upon, rather than attempt to present a new report each year disregarding former ones. With this object in mind, the committee took the 1915 report and brought it up to date by the addition of several important sub-committee reports on new subjects.

Probably the most important addition is the report of the Subcommittee on Cost Accounting. This report indicates three important things: first, to sell to the appliance manager the idea that he should know his true cost of operating his department; second, to give to the appliance manager an idea of what factors make up the true cost, as per standard practice in other retail trades; third, to point out to the appliance manager and his superiors the fact that unless the central station knows its true cost of operating its appliance department, the company would be in a position of unfair competition, which is not a good strategic position for a central station to be in these days.

Another important report is that of the Subcommittee on the Goodwin plan. The committee finds that opposition by central stations to the plan has been due to a misunderstanding and lack of knowledge of the subject. This is very unfortunate indeed as it has been responsible for retarding the development of their own business. Special attention is called to the portion of the report urging that the central stations in particular do their utmost to foster, promote and de-

velop branches of the electrical industry where team work and co-operation do not exist, and must exist if we are to develop our business to its highest efficiency.

The margin of profit on which electrical merchandising is sold is a very important subject. Owing to this previous lack of interest on the part of central stations in this matter the manufacturers have drifted into a sort of rut whereby the central station has educated the manufacturer to believe that it is not interested in the margin of profit allowed on the sale of goods. The result is that both parties have not sold as large an amount of goods as would have been possible under modern practices.

The report of the committee on merchandising tungsten lamps shows that the majority of companies now sell these lamps on a merchandising basis and many of the remaining companies have modified their policies in this respect by charging for the delivery of lamps, etc. It is also pointed out that in some cases the companies have found that more and higher wattage lamps were purchased under the new policy than when free renewals were made.

In regard to the merchandising of table and floor lamps the committee finds the revenue from the sale of these lamps an attractive feature and many companies have already met with pleasing and surprising results from campaigns conducted to promote their sale.

The question of style appeal, changes in style, etc., is brought to the attention of electrical merchandisers for the first time in the report of the Subcommittee on Style Merchandise. In this report it is shown that electrical merchandise is divided into three classes—staples, labor-saving devices and style merchandise, such as portable lamps, fixtures, urns, etc. As electrical merchants cater almost exclusively to women the value of the drawing power of the latter class is especially important and suggestions for buying, pricing, displaying and advertising it to the best advantage are given.

The report of the Subcommittee on Help to Small Central Stations makes the following suggestions to further this work. First, an effort should be made to secure fuller co-ordination between the promotion and sales work done by manufacturers and jobbers to the manifest advantage of the small central-station; second, some means should be found for calling the reports of the merchandising committee to the attention of the small companies; third, the chairmen of the Merchandising Committees of the Geographic Sections should be made members of the Merchandising Committee; fourth, every member of the Merchandising Committee should attempt personally to bring the work of the committee to the attention of these companies.

In addition subcommittee reports on the standardization of cords and plugs and co-ordinate advertising and sales campaigns are contained in the general report of the Merchandise Committee.

LIGHTING SALES BUREAU.

Report of Committee on Commercial Aspects of Lamp Equipment.

O. R. Hogue, Chairman.

This report is a general review of the most important recent developments in lighting accessories, especially those designed for use with Mazda C lamps. Among the equipments described and also largely illustrated are the following: The foot-candle meter, numerous flood-lighting projectors, a safe and reliable etching or frosting solution, the Reflecto-cap unit, the R. L. M. line of standard dome reflectors, the Industrolite unit, reflector-refractor units, tinted glassware, diffusing commercial units, decorated diffusing fixture, the Duplexalite, hospital lighting fixtures, piano lamp, adjustable arm lighting fixture, small portable units and desk lamps, porch and house-number lights, wicker fixtures, vaporproof units, stage-lighting equipment, porcelain sockets, door switch, lever switch, street-lighting units, disconnecting hanger, moving-picture equipment, and the Factrylite unit.

Report of Committee on Outdoor Lighting.

H. H. Magdsick, Chairman.

Attention is called to the comprehensive report on outdoor lighting and practice submitted by the committee at the 1917 convention. The opportunity for active development of these ideas is now at hand. Especially appropriate is the featuring of brilliant lighting displays in connection with victory and peace celebrations, the welcoming of returning troops and other patriotic festivals. These and flood-lighting of the American flag are suggested as immediate opportunities for starting a larger development in outdoor lighting. Illustrations are given of the Jeweled Portal for the Victorious Army erected and flood-lighted on Fifth avenue, New York City.

Report of Committee on Residence Lighting.

C. W. Johnson, Chairman.

The committee's main thought throughout the report is that the value of residence lighting business can be very materially enhanced to the central station through more thorough saturation along existing distributing lines and through sale of more energy to present customers. The former means active pushing of house-wiring of existing buildings, the latter stimulating the use of electrical appliances.

Owing to the uncertain conditions prevailing during the past year, the central-station companies were unable to solicit new consumers. During the fuel shortage, lighting restrictions tended to reduce further the income from even the residence business. These now have been entirely removed and every effort must be made to make the residence business a more profitable factor in central-station work.

Results of a questionnaire on recent and present residence-business policies are given, showing various means to be used to increase earnings from residence customers. Results and methods used in some house-wiring campaigns are given, also typical forms and rules on house wiring and line extensions.

Report of Committee on Electrical Advertising.

E. A. Miller, Chairman.

There is undoubted prosperity ahead for electrical advertising. The extension of business is divided under two general heads, namely, rejuvenating those signs already in operation, but permitted to deteriorate owing to the lightless night edict of the Fuel Administrator, and new business in the direction of new signs, or more properly speaking, new sign prospects.

The recommendation is made that the central stations use their efforts to have the old signs relighted and relamped through a systematic canvass and that the prospective new business be taken care of by reviving the various electric sign bureaus.

One field for electrical advertising that has not yet been developed or much considered is that of industrial plants. In many cases one of the best advertise-

ments of a manufacturing concern is its plant. There are thousands of factories unidentified to the traveler or casual passerby; a gleaming electric sign would be a potent advertising factor. The report also recommends the use of the phrase "Electrical Advertising" rather than "Electric Signs," as suggested by the committee handling this subject in 1917; and also indorses previous recommendations made regarding censorship of signs, attractiveness, etc. It is the opinion of the committee that no previous period has been so full of opportunity for electrical advertising.

Report of Committee on Store Lighting.

A. L. Powell, Vice-Chairman.

A brief analysis of the present status of store lighting, due to the recent light curtailment movement made necessary by the fuel shortage, and the effect of this are discussed. Merchants' sales suffered because of the diminished lighting.

The various classes of stores, large drygoods and department, distinctive shops and ordinary small stores and their relation to central stations are outlined. The ordinary small store, existing in considerable numbers in every city, is most important from the standpoint of obtaining new business rapidly.

A campaign which might be carried out with a minimum executive supervision to obtain this class of business is outlined and numerous hints are given as to the best methods of interesting the prospects. It is recommended that a few simple but effective designs of lighting units be selected and made up in large quantities so as to secure favorable prices through quantity production. Suitable literature, advertising, lectures, etc., should help the campaign.

The concluding proposition of the report covers show windows, discussing their purpose and pointing out the possibilities of important future developments in window lighting, giving a special emphasis to color variation and direction of light and effect of backgrounds.

Report of Committee on Lighting of Public Buildings.

G. Bertram Regar, Chairman.

In this first report of this new committee it explains that its functions are the study of sales methods and campaigns to obtain the new business, and the correcting of existing inefficient lighting installations of public buildings. This class of buildings as a rule is poorly lighted, owing principally to the difficulty of reaching those responsible for the lighting.

Illuminating engineering methods bring to the central stations a creative force for the development of bigger and better business. The study of illuminating engineering does not entail as undue an amount of work as is perhaps assumed, owing to the general methods of illumination being well established. Closer relations between the central stations, on the one hand, and the engineers, architects and contractors, on the other, are desirable and should be encouraged. The methods used by the Commonwealth Edison Co., Chicago, in fostering these relations are described; also the church-lighting campaign carried on by the Philadelphia Electric Co., some years ago.

The committee suggests that the central stations throughout the country inaugurate an energetic campaign for good lighting and that in this connection monographs on the subject of the several classes of lighting should be prepared by the National Electric Light Association for the use of central stations.

ELECTRIC RANGE COMMITTEE.

Report of Electric Range Committee.

By C. E. Michel, Chairman.

This report reviews the situation existing since 1917 when the war created unprecedented conditions as regards purchasing power, labor and materials, and how conditions gradually mended as the country got on a strictly war basis and the conservation of foodstuffs and fuel began to encourage the use of electric ranges. Conditions as reported from the East, West, Northwest, Middle West, Far West, South and Southwest are given. In supplementary reports, entitled "Report of Subcommittee on Sales Methods and Commercial Recommendations," "Report of Subcommittee on Standardization," "Report of Subcommittee on Water Heating," these various topics are each taken up separately.

The use of heavy-duty ranges by hotels, clubs, restaurants and institutions is making considerable progress. It is believed that 1919 will see the electric range gain a tremendous impetus. Scores of central stations which have heretofore discouraged the sale of ranges are today planning extensive range campaigns. Continual use of electric water heaters is making headway on the Pacific Coast, where reliable thermal control switches are being employed. Considerable success with water heaters is reported in that section, low rates being offered as an inducement.

Report of Sub-Committee on Commercial Information and Recommendations.

John Abbink, Chairman.

This report represents commercial data applying primarily to electric ranges. Data have been collected from more than one hundred central stations that have been more than ordinarily successful in the sale of electric ranges and promoting their use. The question of rates receives a lengthy review, the rates and the revenue that is derived in a number of cities from families of varying numbers is tabulated, for various seasons of the year. A number of curves are given, showing the average daily energy consumption of apartment houses where different numbers of electric ranges are installed. Statements on pertinent matters from a number of central stations are included. Under the title of "Sales Policies and Their Effect" electric range trials, their installation upon a cash, partial payment and rental basis are discussed, while the value of electric range demonstrations and co-operation with dealers is taken up. The fundamentals of good range selling campaigns and methods of some of the difficulties are reviewed, while a model campaign is outlined. The report closes with the prediction that the future is very bright as viewed by those companies and manufacturers who have been most successful in the past in selling electric ranges.

Technical and Hydroelectric Sessions

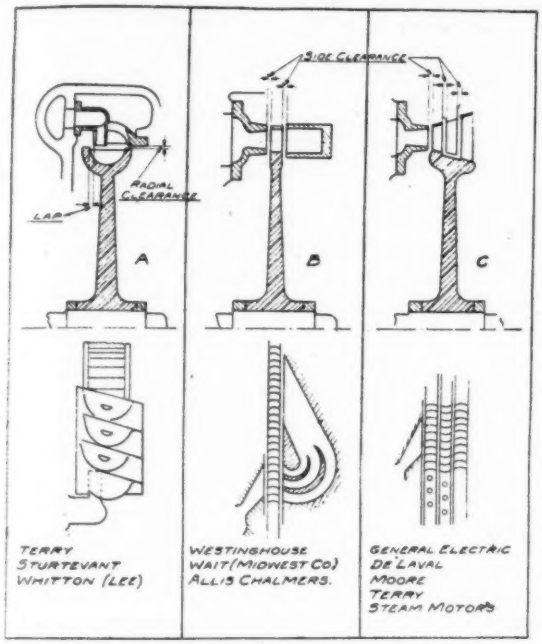
Report of Committee on Prime Movers.

N. A. Carle, Chairman.

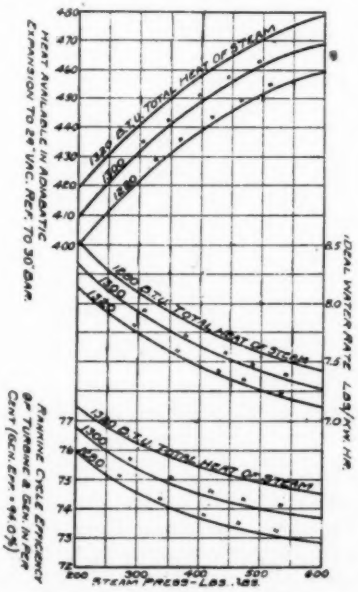
Steam Power.—The report discusses various phases of the problem of selecting turbines with proper regard to the size of the system as a whole, and includes information as to the operating records of large sized turbines, together with statements submitted by manufacturers reviewing progress during the past year.

The development of condensers, boilers, super-

heaters, stokers, economizers and power station auxiliaries is covered in detail. The wider use of boiler and turbine room instruments is recommended as a means of checking operating conditions. Storage and handling of coal are discussed and several of the newest installations are described. Mention is made of the possibilities of the use of pulverized fuels of lignites. Further discussion of the advantages and disadvantages of higher steam pressures is included and brief reference is made to the proposed scheme of extracting by-products from raw fuel before firing under boilers.



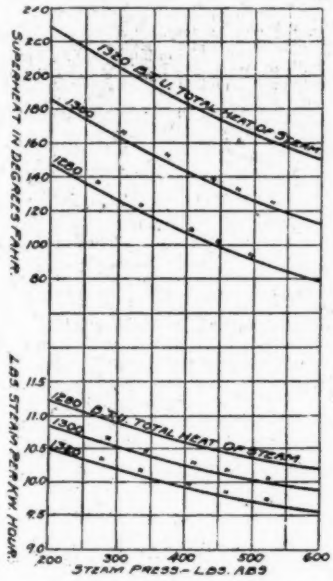
Design Features of Various Classes of Turbines.


HEAT AVAILABLE IN ADIABATIC EXPANSION TO 29" VAC. REF. TO 30" BAR.
1350 B.T.U. TOTAL HEAT OF STEAM
1300
1250
1200 B.T.U. TOTAL HEAT OF STEAM
1300
1350
1300 B.T.U. TOTAL HEAT OF STEAM
1300
1350
RANKINE CYCLE EFFICIENCY OF TURBINE & GEN. IN PER CENT (GEN. EFF. = 94.0%)
IDEAL WATER RATE LBS/KW. HR.
STEAM PRESS - LBS. ABS.

Operating Characteristics of 60,000-kw. 2-Cylinder Turbine with Higher Steam Pressures.

Water Power.—The report includes a general discussion of water-power developments during the past year and notes the tendency to go to fewer but larger units. Improvements in details of general design are noted and the record of progress as submitted by manufacturers is included.

Gas Power.—The production of fuel oil from various fields in the United States is shown in tabulated form. The development of Diesel engines has been mainly in the field of marine engineering, but improved design features are being incorporated in engines for land plants. Reference is made to Bureau of Mines Bulletin No. 156 for exhaustive investigation and report on the Diesel engine.



Water Rate of 60,000-kw. 3-Cylinder Turbine with Higher Steam Pressures.

Report of Committee on Underground Construction and Electrolysis.

E. B. Meyer, Chairman.

The report deals with the general subject of heating of cables and recommends that determination of cable loading be based on actual temperature surveys of the conduit line.

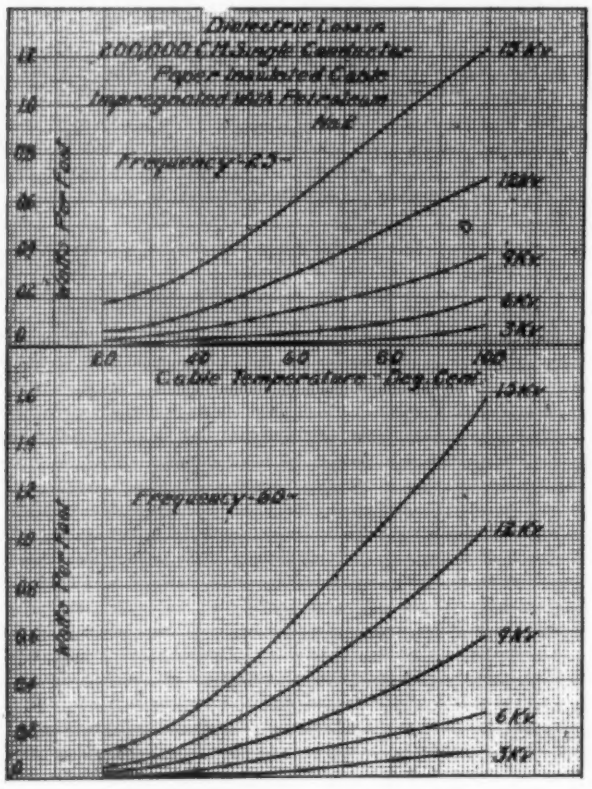
The section on dielectric losses gives curves showing comparison of dielectric losses in mineral oil and rosin oil compounds and includes the result of a series of tests conducted by a member company. The accurate recording of cable failures is urged upon member companies. A classification of 1918 cable failures is worked up in tabulated form and figures of cable failures per hundred miles of cable are included. Three methods in successful use by member companies are described in detail.

The various methods of fireproofing cables in manholes are discussed and compared as to effectiveness and cost. As a result of numerous inquiries as to proper duct sizes, a questionnaire was sent out and the results show the trend of development as regards both ducts and maximum cable diameters. The increase in the number and rating of transformers installed underground makes this subject of general interest. The report recommends the installation of liberally designed manholes rather than the use of forced ventilation. Difference of opinion exists as to the desirability of using paraffine in high-tension joints. Paraffine joints may give good results if skillfully made.

A general statement of practice in the operation of three-wire Edison systems is included with detailed

information on the installation and maintenance of neutral wires. Under the heading of underground street lighting circuits the report gives a resumé of practice of member companies in installing underground street lighting equipment.

The lack of a reliable and reasonably cheap cutout



Dielectric Loss in 200,000-c.m. Single-Conductor Cable.

is commented upon. General methods of connecting up and protecting underground distribution circuits are shown diagrammatically. Special devices and methods are discussed, including pneumatic cutting tools, concrete mixers, kerosene torches, manhole pumps, cable grips, trenching equipment and the use of a special split core testing transformer. Previous reports of the committee contain a large amount of information on underground systems and a topical index has been prepared to put this in a convenient form for reference.

Report of Committee on Overhead Lines and Inductive Interference.

A. E. Silver, Chairman.

This report indicates that the committee has not been generally active during the war period and its report is confined mainly to discussion of the present status of certain essential problems and of future policies in connection therewith.

The inductive interference situation has not shown marked development during the war emergency, aside from certain new commission regulations. A movement is under way to establish wave-shape limitations for new synchronous power apparatus in order to eliminate or reduce such harmonics as tend to occasion inductive interference to telephone circuits. The inductive interference problem is an important one, not merely to the power and telephone industries directly involved, but to the public generally. It is vital that efforts toward a solution shall avoid imposing material handicaps upon high-voltage power distribution and transmission, which is coming to be recognized as a controlling element in the industrial and general development of the country. There is need for thorough and sincere co-operation between the two industries. The committee hopes to serve as a means of co-ordinating the efforts of the various power companies and asks that it be kept in touch with new developments. Discussion of certain technical aspects of the problem is given in an attached article by John B. Taylor.

Several state commissions have issued new regulations in regard to construction of electric lines, some of these based upon the National Electrical Safety Code. Due to the fact that during the war period construction of new lines has either been largely suspended or has been of an emergency character, there has as yet been little opportunity for the electric light and power companies to try out the Safety Code by practical application to new work.

Considerable attention at this time is being given to joint use of poles by power and telephone circuits, and considerations of safety, convenience, economy and the public welfare generally appear to call for extension of this practice.

The formative period into which the electrical industry generally appears to be entering will probably result in considerable change in overhead line practice and numerous movements are under way looking to standardization and improvement in line materials and designs.

Report of Committee on Electrical Apparatus.

R. F. Schuchardt, Chairman.

This report takes up to considerable length fires, fire prevention protective apparatus and the experiences of a number of companies as to turbogenerator fires. Switchboards and transformers are briefly discussed by subcommittees. Considerable information of a valuable nature is given on the subject of customers' industrial substations, the various types as indoor, outdoor, etc., being considered separately. Special prominence has been devoted to the automatic substation and the attendantless substation controlled from a distance. Power-factor receives attention and the importance of the power-factor survey, of power-factor correction and apparatus involved are taken up with especial reference to the synchronous condenser and the most advantageous location for corrective equipment. Under the subject head of apparatus for special fields, the electric furnace is dealt with at some length, after which electric welding apparatus is discussed. Electrification of oil fields and some of the problems and the apparatus that has been designed for this purpose is reviewed.

Report of Committee on Meters.

F. V. Magalhaes, Chairman.

This report represents the work done by the above committee since its formation in January of this year. This work embraces the compilation of data on the performance of instrument transformers, the practice of testing potential transformers used with watt-hour meters and methods of measuring maximum demand on inductive circuits. Lectures upon meters, instruction courses for training meter repair men and testers, and similar matters resulting from the situation created during the war are briefly reviewed. While the manufacturers of electrical instruments report but little in the way of new developments as to meters and measuring devices, several interesting developments are described.

Electric Vehicle Sessions

Report of Committee on Legislation.

G. A. Freeman, Chairman.

The report of this committee points out the growing tendency in several states to increase vehicle taxes on account of the inability of improved country roads to withstand the heavy truck and passenger automobile traffic. It is explained that the electric vehicle is not in a large way a user of these roads but is confined principally to the city streets which are built to withstand heavy traffic. For this reason the State of Maryland in its increased vehicle tax law, recently passed, will tax the electric solid-tired vehicles only one-half the tax imposed on other similar vehicles, while the license fee for cars on pneumatic tires is based on horsepower only which is very favorable for the electric.

The committee, however, has done very little in state legislation matters during the year but has been successful through co-operation with the National Automobile Chamber of Commerce in reducing and eliminating several war tax measures.

The committee urges the Association to assist it in securing a uniform motor vehicle tax law and requests the members to notify its officers in the event of any proposed law affecting the users of electric vehicles.

Report of the Manufacturers' and Central-Station Co-operation Committee.

George B. Foster, Chairman.

It is the belief of the committee that the interests of the Electric Vehicle Section can best be served by the prompt collection of as much information regarding the installation, operation and maintenance of electric vehicles and accessories as possible, as well as by the widest distribution of these facts. Particularly is it desirable to place this information in the hands of engineers, and in all institutions where engineers are trained.

It is a noteworthy fact that all of the vehicle manufacturers are enjoying an abundance of business, notwithstanding the sudden curtailment of the so-called war industries by the signing of the armistice. An analysis of the business secured by electric vehicle manufacturers during the last two years, however, discloses the fact that a large percentage of this business is confined to a comparatively few leading lines of industry, as, for instance, express companies, bakeries and ice-cream manufacturers. The question naturally arises as to what steps can best be taken to add other lines of industry to those which may be considered as convinced on the question of electric vehicle transportation. This is a large undertaking, but a step in the right direction will be taken, in the judgment of the committee, if the services of some reliable high-grade firm of consulting engineers be retained to pass on the merits of the electric truck as compared with the gas truck or with horse-drawn vehicles. It will be recognized at once that a report favorable to the electric vehicle by such a firm of engineers would be exceedingly far-reaching and have much advertising value.

Report of the Standardization Committee.

E. R. Whitney, Chairman.

As all matters of standardization relating to electric vehicles and accessories are handled by the Society of Automotive Engineers, the work of this committee is largely of an advisory or consulting nature. A review of standardization which has previously been effected includes the following standards: Two sizes of charging plugs and receptacles, motor voltages, motor name plates, number of battery cells, speed ratings, mileage ratings, and dimensions for storage battery jars.

A number of other features have been under consideration but very little has been done on account of the press of more important matters and the shortage in engineering departments. This condition is now rapidly improving and it should be feasible to take up again, at an early date, a number of features which manufacturers can agree on as standards to good advantage, including standard lamp bulbs and standard assemblies for storage batteries, etc.

Report of the Committee on Garage and Rates.

C. H. Miles, Chairman.

This committee reported that the standardization of rates and electric garage conditions has been largely accomplished and, at the present time most member companies are providing a rate for current that is favorable to the electric vehicle, and garages are being established wherever the demand seems to be sufficient to warrant them. Prior to the cessation of activities, the committee considered the standardization of an interchangeable battery compartment, and considerable progress was made along this line. The committee has been able to assist the development of the industry by co-operating with local committees on the settlement of difficulties regarding rates or garage operation.

Report of Transportation Engineering Committee.

F. M. Feiker, Chairman.

This committee was not appointed until Jan. 9, 1919, and its report is largely a summary of work to be done rather than that which has been done. The work to be done has been divided into four general duties as follows: To analyze transportation conditions and requirements, and to collect operating data as a basis for formulating an educational course in transportation engineering, with particular reference to electric industrial and commercial transportation; to correspond and confer with educational institutions with the idea of co-operating in the establishment of transportation engineering courses and the furnishing of data on the place of the electric commercial and industrial truck; to interest consulting engineers in transportation engineering and the place of the electric commercial and industrial truck in the transportation problem; to distribute useful data to member companies as an aid in establishing and conducting Electric Vehicle Bureaus in central stations and to develop lectures on transportation engineering.

Present and Future Status of Electric Vehicle.

By Rodney K. Merrick.

In Mr. Merrick's opinion, the outlook for the electric truck has never been brighter than at the present time. This is shown by the changing attitude of the public towards these trucks at the recent motor-truck shows. At former shows the general truck-buying public was distinctly hostile to electrics but at the recent ones showed a remarkable interest in them. This change of attitude is due to a number of reasons. In the first place a large number of fleets of trucks now in use have proven very satisfactory

and there is a vast improvement in the electric truck of the present time as compared with its predecessor of eight or ten years ago. In addition many large users have learned that the added speed of the gasoline truck is not as great an advantage as they formerly supposed. The prevailing high cost of labor has also forced many firms to consider the electric to replace the horse in order that they may get more work out of the men by giving them better tools with which to work. Another reason is that large concerns having solved their long delivery problems by using gasoline trucks are now turning their attention to city hauling and for this purpose the electric offers many advantages.

Regarding central-station co-operation Mr. Merrick believes that this can be accomplished by giving good service as well as low rates to the users of electric trucks. He pointed out the advantages of delivering the proper current, 110 or 220-volt direct current, to the customer without additional investment on his part by supplying converting apparatus for the customer's use in alternating-current districts. If this equipment could be furnished either by the central-station or the manufacturer it would aid considerably.

A Messag from Electrical Vehicle Users.

By George B. Foster.

There is no doubt that the actual user of an electric vehicle is the logical one to give the best information of its practical day-in and day-out accomplishments. The letters from many satisfied users of electric vehicles which are quoted in part in this paper indicate very clearly that this means of transportation is the one best suited to practically every type of modern delivery service. Department stores, laundries, bakeries, dairies, confectioners, wholesale grocers and many others seem to be of one accord as to the satisfaction that they have obtained. Such enthusiastic statements from so many different lines of industry as to the efficiency, economy and reliability of the electric vehicle are the most conclusive proof of the superiority of this modern mode of transportation.

Electrical Industrial Trucks and Tractors and Their Relations to the Central-Station Load.

By E. J. Bartlett.

The impetus which was given to the use of electric industrial trucks and tractors by the war-time conditions brought into prominence many new types of machines and improvements which apparently are not known by the majority of men in the industry. For this reason Mr. Bartlett described briefly the more common types of apparatus, namely, industrial, three-wheel, and four-wheel tractors, industrial trucks, utility trucks, baggage trucks, low-platform trucks, lift trucks and several special designs and their advantages and applications.

There are now 10 or 12 manufacturers of this apparatus having a total capacity for about 5000 machines a year. These manufacturers are devoting a considerable amount of advertising and sales efforts to their development in which they are being ably assisted by the manufacturers of storage-battery equipment. The author estimates that there are 8000 of these machines in use at the present time in straight simple applications, that is, where nothing special in the way of new types of machines or plant changes are required. This is about one-fifth of the total field for such applications. Beyond these obvious applications, however, are several times this amount dependent upon education and plant changes principally and also upon improved and changed types of machines.

Mr. Bartlett then described the battery equipment and power requirements of the electric industrial vehicle. He roughly estimated that the average current consumption per day per unit is 20 to 25 kw-hr. or 6750 kw-hr. per year. He pointed out that this is an off-peak, and therefore, a highly desirable load for central-stations and urged their co-operation in the development and introduction of this apparatus.

Proper Application of Commercial Electric Vehicles.

By F. F. Sampson.

This paper gives the reasons for failure of the electric vehicle in cases where it has been misapplied in the past. It shows further the very large field for the electric within its radius of operation.

The number of electrics in service in the New York metropolitan district, the length of time that the vehicles have been in service, and other interesting data are shown. It also states the number of different lines of business using the electric vehicle, showing pictures of trucks used in about forty lines of business in the New York territory. It is suggested in the paper that facts and figures on the cost of hauling with the electric vehicle be widely distributed among prospective users, especially those users engaged in the same line of business as are the present users of electrics.

Salesman's Viewpoint of Electric Vehicles.

By J. B. N. Cardoza.

This paper points out that one reason why electric street trucks are not used more extensively for operation under 45 miles a day is the lack of general belief in the lower operating cost of these vehicles. A great many men are really convinced that large savings can be obtained through their use but the lack of sufficient accurate information on this subject prevents their adoption. To remedy this condition, Mr. Cardoza recommends that the service of three unbiased, nationally known consulting engineers be employed to make a report on the average costs of operating electric and gasoline trucks. Such a report he explained would give these men the moral support to adopt the electric truck and be of great value to the industry as well.

The question of getting users to provide a fund to take care of battery renewals or replacements was also brought out. Although the advantages of such a fund is explained to customers by the manufacturers the majority of them do not make this provision. As a remedy for this Mr. Cardoza suggests that the large banks be influenced to solicit such funds as they are seldom withdrawn for long periods and offer many inducements to such institutions. The paper also shows the lack of men who are familiar with the fine points of the electric street truck and shows an annual sale of 40,000 of such vehicles if men could be educated to sell and service them.

Accounting Sessions

Report on Uniform Classification of Accounts.

William Schmidt, Jr., Chairman.

The report states that the year's activities of the committee were very limited, its work having been greatly handicapped during the past year as a result of the prevailing war conditions. Work of the committee was gradually curtailed and the committee remained practically inactive until a recent meeting of

the Executive Committee, when it was decided to resume its work and make a further effort to obtain the adoption of a national standard classification of accounts. The report reviews the ground covered by the committee during the past few years in the matter of standard classification of accounts, pointing out the progress made with public service commissions. Considerable difficulty has been experienced in carrying out the instructions contained in the "Fixed Capital" account, and the committee therefore recommends that the account designated as "Plant Investment" be included in the Association's classification of accounts, and after its adoption that the National Association of Railway and Public Utilities Commissioners be urged to approve its substitution for the present "Fixed Capital" account contained in the commissions' classifications.

Report of Committee on Cost Accounting and Statistics.

A. D. Spencer, Chairman.

The committee, which was organized to prepare a uniform system of cost accounting based on the Standard Classification of Accounts, believes that the compilation of such a system at the present time would be premature, as the uniform classification has not been widely adopted, and as such a cost accounting involves basic principles about which there is wide difference of opinion. The committee suggests that it limit its scope of the study of principles and methods of cost accounting, without attempting to compile a detailed standard cost accounting system at present.

Report of Committee on Commission Accounting Rulings.

H. E. Addenbrooke, Chairman.

The committee is endeavoring to obtain a classified list of all commission accounting rulings issued up to the present time in order to make a comprehensive study of them. At the moment it is impossible to say whether this important work can be carried out without appealing directly to the various commissions for their co-operation, but it may be necessary to take this action. The committee urges that the subject of the cost of issuing bonds, notes and obligations, and the discount in connection therewith, be given more careful consideration as should also the subject of depreciation, from an accounting point of view. Careful study should be given to the matter of reserves for replacements, sinking funds, etc. Facts should be presented showing how reserves are viewed and treated by the commissions, so that where doubt exists, or restrictive orders or rulings are enforced, the committee may well present to commissions for their consideration a suggested method, setting forth the full reasons therefor.

Report of Committee on Accounting Service to Member Companies and the Monthly Bulletin.

Frederick Smith, Chairman.

The report covers service rendered by the committee through its state representatives to member companies in solving general accounting problems other than those dealt with by the standing subcommittees.

Report of Committee on Accounting Education.

H. B. Lohmeyer, Chairman.

The committee during the past year has bent its efforts to bringing before the industry the value and importance of the accounting courses and to completing all the lessons of the advanced course, which is thoroughly typical of the progressive character of the electric utility business. It is complete in every respect covering both the theory and practice, and the practical contact of the accounting work with operating and administrative matters has been ensured in many different ways. This course has been written for the electric utility industry and presents a specialized course in business administration, finance and accounts. Its scope is such as to meet the needs of the operating man and commercial man, as well as the accountant.

Report of Committee on Operating Records.

C. A. White, Chairman.

The report covers a standard set of forms to be used in connection with the standard uniform system of accounting for transportation work of central station companies, as reported to the 1917 convention by the 1916 and 1917 Operating Records Committee. As the forms submitted were designed for universal adoption, it is recommended that the association print these forms in quantities in order that member companies can purchase them at a minimum cost. The report gives 15 forms for general adoption with full explanation as to their use.

Motor Transportation in the U. S. Army.

By H. B. Lohmeyer.

This address deals with the operation of the Motor Transport Corps, U. S. Army, covering particularly the maintenance of motor equipment at the base shops and in the field, together with an outline of the accounting and shop production control system used in the shops upon which Mr. Lohmeyer was engaged while a captain in the service.

Report of Committee on Purchasing and Storeroom Accounting.

W. F. Stevens, Chairman.

The most important matter taken up by the committee is the development of the billing machine for stock record work. In the report is explained a system devised for reducing clerical errors of stock record work by means of fisher billing machines. This system of posting involves several interesting features, notably that of the accuracy of the adding machine in drawing balances and the check on posting to the wrong card. The shortage of labor during the war resulted in the employment of women in stock rooms in the place of men. A detailed description is given of an expedient brought about by the war, with special reference to a suitable costume designed for women engaged in such work. Consideration is also given to an improved method of storing barrels and a system outlined for piling oil barrels in order to save injury and economize in floor space. New developments in apparatus for handling junk metals and transportation equipment have been made by a member company and these are briefly described in the report.

Report of Committee on Customers' Records and Billing Methods.

H. C. Schlegel, Chairman.

The committee in its report deals with the importance of maintaining an efficient clerical force, and emphasizes the need of providing ways and means for its advancement, and education. A number of representative ledger forms are reproduced, and a system reviewed which eliminates the ordinary customers' ledger for the major portion of monthly transactions. It gives a brief description of the method of typewriter billing and posting, and a reference to bi-monthly and quarterly billing.

Editorial Comment

The National Electric Light Association Convention

ONE of the most important conventions ever held by the National Electric Light Association was assembled in Atlantic City on three strenuous days this week. The large attendance and the keen interest taken in all the proceedings showed that the leaders of the central-station industry realize that this industry has reached an epochal point in its career and stands at the threshold of an era of unprecedented development. Its splendid achievements during the war, freely recognized and acknowledged by our Federal Government, have only prepared it for still greater service to the country as a whole. The possibilities in this line were fittingly pointed out by Dr. George Otis Smith, director of the United States Geological Survey, a keen observer of what the central-station industry has already done in the conservation of our fuel and power resources and a conservative judge of the by far greater economies that will result from general electrification of railroads and industries and interconnection of large, efficient power systems.

For nearly 35 years leadership in the central-station industry has rested in the National Electric Light Association. It was very appropriate, therefore, that a number of features on this year's convention program should deal with the Association putting itself into a condition of preparedness for the still more responsible leadership that it will be its privilege and duty to assume during the coming years of electrical expansion. Changes in the organization and conduct of its activities are already foreseen in the proposal to bring the geographic sections into closer touch with the national headquarters, to more effectively co-ordinate the work of the committees and other activities by appointment of a managing director and to stimulate the effectiveness of the local or company sections. Possibility of a change in the conduct of the national conventions also was mentioned, this week's gathering (the first big one in three years) showing again that these assemblies are becoming too unwieldy. On two afternoons there were five parallel sessions; many delegates were interested in more than one of these simultaneous meetings. These matters should (and doubtless will) receive careful attention by the incoming administration.

Significant was the attention to the spread of socialism given in Mr. W. F. Wells' presidential address, and in the special address on this subject by Mr. F. G. R. Gordon. There is an undoubted trend toward government and municipal ownership and the fallacies of this doctrine must be made more clear to the American public. One solution proposed is that of customer ownership, whose advantages and the methods of accomplishing of which were pointed out in the excellent report of the committee of which Mr. W. H. Hodge is chairman. It aims to combine the valuable features of efficient private ownership with the public good will obtained from ownership by many. In spite of numerous difficulties during the war, it made substantial headway. The increased number of investors resulting from the stimulus of the Liberty Loan drives should make for utility securities a more favorable local market than ever before. An extension of the sale of company securities to customers and to the local public in general may therefore be looked forward to.

Among the business-development and technical matters coming before the convention especially noteworthy was the large amount of attention given to lighting development, to power-factor and use of synchronous motors, to wiring practice, prime movers, electric trucks and tractors, electric ranges and water heaters. In this general comment on the convention it is possible to refer to only a few of its outstanding features. In conclusion, the convention certainly brought an unusual fund of valuable information to the central-station men and others in attendance and inspired them with new courage to continue the present readjustment and to face with enthusiasm the promise of an extremely prosperous future.

The ELECTRICAL REVIEW takes both pleasure and pride in being able to place before its readers a comprehensive telegraphic report of the convention proceedings, devoting over half of this issue to this most important electrical gathering.

The Future of Electric Vehicles

FROM the reports and papers presented at the various sessions of the Vehicle Section of the National Electric Light Association it appears that the electric street truck and industrial electric truck and tractor are in stronger and better positions at the present than they have been at any time since their introduction. In the case of the industrial electric apparatus this particularly bright outlook is the result of the powerful impetus given to the use of these machines by the extreme conditions that existed during the war, and the fact that in their many adoptions during this period they fulfilled all claims made by the manufacturers for them. Coupled with and adding great emphasis to this condition is the promised co-operation of the central stations and the rest of the industry in their future development.

In the case of the electric street truck, this condition may be attributed to several reasons which were

outlined in the paper presented by Rodney K. Merrick. These reasons may be briefly stated as follows: First, the satisfactory results which have been obtained in all large installations thus far; second, the great improvements in the trucks themselves; third, realization by large users that the higher speed of the gasoline vehicle is not as great an advantage as was formerly supposed; fourth, the prevailing high labor costs which have forced man-power to be utilized to the fullest possible extent; and lastly, that large users having solved their more apparent long-delivery problems by the use of gasoline trucks, are now turning their attention to the shorter hauls for which the electric is best adapted.

In this and several other reports, however, some valuable suggestions were made which should aid materially in promoting the sale and use of electric vehicles particularly the street truck. Perhaps the most important and promising of these recommendations was that which urged the employment of a recognized firm of consulting engineers to collect data relative to the cost of operating gas and electric trucks. Such a report, it is believed, will be very favorable to the electric and will relieve the doubt on this subject which now exists in the minds of many prospective customers. Another valuable suggestion is that the manufacturers and central stations get together to devise, if possible, some means of furnishing the required charging current to the customer without additional expense on his part. These and other suggestions and data which were presented to the Section deserve the fullest consideration of the industry as a whole for there is no doubt but their adoption will greatly assist in furthering the sale and use of these vehicles.

Industrial Consumers' Substations

BY industrial consumers' substations is understood the sub-station located directly at or in close proximity to the consumer served. This type of substation has increased rapidly in numbers and in capacity and importance with the years, because the individual loads represented by the industrial customer have assumed larger and larger proportions. These industrial substations on some of the larger and more extensive central-station systems are picked up from transmission lines that are more truly distributing lines; are frequently supplied from two or more directions, and constitute part of ring and radial systems of distribution.

One of the first requirements of the industrial consumers' substations is that it must be reliable, and reliability depends very largely upon the foresight with which the station layout has been designed and the manner in which well-chosen and well-proved equipment is installed. Under this category naturally falls such matters as safeguards and automatic interlocking devices that prevent careless, excited or ignorant persons from endangering themselves, service and equipment. Some of the precautions in this respect were mentioned on page 816 of the ELECTRICAL REVIEW.

The automatic substation, automatic in that it operates entirely without an attendant or can be controlled from a distance, is a form of substation that may be expected to find increasing application. While the initial cost may be higher than that of the substation where the many necessary automatic features are absent, the annual expense will be lower, because the labor item is eliminated. The automatic substation—just as the automatic hydroelectric plant—is eminently well suited to the installation upon the customers' premises and for the smaller loads. This class of station is being used today in steel mills, and similar places, and comprises synchronous-motor sets, motor-generator flywheel balancer sets, and units for converting from alternating current to direct current. Operating experience shows that the attendantless substation even when containing such quasi-complicated apparatus as the above is reliable and financially worth while.

In the report of the sub-committee on substations, presented before the National Electric Light Association this week at Atlantic City, considerable space is devoted to the industrial consumers' substation, the indoor and the outdoor types both receiving their quota of attention. It is noted, however, with regret that nothing in this valuable report is said as to the predetermination of transformer vault dimensions as based upon transformer losses. A substation housing transformer may be safe, flexible and have many refinements. But only when it has the minimum dimensions feasible will it have minimum cost, other things remaining the same. The minimum dimensions, based upon the dissipation of heat losses and not on clearances for making inspections and repairs, etc., can be obtained only when the rate of heat dissipation can be calculated.

The problem of dissipating heat losses is not an easy one where the quantity of heat to be disposed of is large, and where the transformer substation or vault is entirely enclosed or its dimensions restricted, both of which are frequently encountered in the downtown and thickly populated districts of many cities. There are a number of empirical formulas covering the ratio of transformer heat losses to cubic space of substation for various temperature rises and materials at the surfaces. However, it is the experience of companies employing transformer vaults under difficult circumstances that actual operating temperatures cannot be foretold with accuracy.

Extensive tests of a number of transformer vaults have been made to determine the dimensions of enclosed transformer vaults for different transformer capacities and load-factors by one large company to our knowledge and it is to be hoped the next report of the Committee on Electrical Apparatus will include some data upon this matter, for the subject is an important one, and one that concerns many operating companies.

Week's Events

Calvert Townley, A. I. E. E. President—Record Electrical Exports—Edison Medal to B. G. Lamme—S. E. D. Report

CALVERT TOWNLEY ELECTED PRESIDENT OF A. I. E. E.

Election of Officers and Report of Board of Directors Features of Business Program at Annual Meeting.

At the annual business meeting of the 350th regular meeting of the American Institute of Electrical Engineers, held in New York, May 16, the report of the committee of tellers on the election of officers for the administrative year beginning Aug. 1, 1919, was presented, and the following were declared elected:

President: Calvert Townley, New York, N. Y.

Vice-presidents: Charles E. Skinner, Pittsburgh, Pa.; John B. Fisken, Spokane, Wash.; N. A. Carle, Newark, N. J.; L. R. Jorgensen, San Francisco, Cal.; Wills Maclachlan, Toronto, Ont.; A. M. Schoen, Atlanta, Ga.

Calvert Townley, President-Elect, A. I. E. E., at Work at His Desk.

Managers: L. E. Imlay, Niagara Falls, N. Y.; L. F. Morehouse, New York, N. Y.; F. F. Fowle, Chicago, Ill.

Treasurer: Geo. A. Hamilton, Elizabeth, N. J., (re-elected).

The above, together with the following holdover officers, will constitute the Board of Directors for the next administrative year: C. A. Adams, Cambridge, Mass.; W. A. Del Mar, New York; G. Faccioli, Pittsfield, Mass.; W. A. Hall, Lynn, Mass.; E. H. Martindale, Cleveland, Ohio; F. D. Newbury, Pittsburgh, Pa.; E. W. Rice, Jr., Schenectady, N. Y.; Charles Robbins, Pittsburgh, Pa.; Charles F. Ruffner, St. Louis, Mo.; W. I. Slichter, New York; Wilfred Sykes, Pittsburgh, Pa. Ten states and Canada are represented in the above list.

At the meeting of the Board of Directors held on the same date F. L. Hutchinson was re-elected secretary of the Institute for the coming administrative year.

The Board of Directors in its annual report reviewed the activities of the Institute, its committees and sections for the year ended April 30, 1919. A net increase of 1070 members occurred during the year, and the total membership has for the first time passed the 10,000 mark. On April 30 it was classified as follows: Honorary members, 6; fellows, 489; members, 1467; associates, 8390; the actual total was 10,352. Institute members took active part in the war to the number of 1417, and of this number 12 died in service. During the war attendance at meetings, especially of the student branches, fell off considerably, but is being revived. The Institute continued practically all its activities and quite a few were accelerated to aid the nation.

Following the business features of the meeting came the presentation of the Edison Medal to B. J. Lamme, which is reported elsewhere in this issue.

Career of the President-Elect.

Calvert Townley, the newly-elected president, joined the American Institute of Electrical Engineers in 1901 and has been almost continuously active therein ever since. He has been a manager and a vice-president, has served on many committees and has written an occasional paper. During the year just past he has been an American Institute of Electrical Engineers' trustee and first vice-president of the United Engineering Society, a member of the Engineering Council, chairman of the Public Policy and of the Development Committees, and a member of the Edison Medal and of other committees.

He was born Oct. 18, 1864, in Cincinnati, Ohio, where he lived until the age of 23. He prepared for Yale at Chickering Institute, a local private school, and was graduated from the Sheffield Scientific School in 1886, thereafter continuing his studies and taking the M. E. degree in 1888. Starting with the Westinghouse Electric & Manufacturing Co. (then the Westinghouse Electric Co.) in the fall of 1887 as a young road engineer, he continued with the company 17 years successively at Cincinnati, Pittsburgh, Boston and New York and serving in many capacities, including those of Boston office manager, assistant to the first vice-president and general agent. At the close of 1904 he resigned from the Westinghouse company to take the position of the acting fourth vice-president of the New York, New Haven & Hartford Railroad Co. in charge of its electrification out of New York, subsequently becoming first vice-president of the Consolidated Railway Co. (afterwards the Connecticut Co.), which operated and later owned some thirty odd trolley, light, power, gas and water utility corporations throughout New England.

In 1911, Mr. Townley re-entered the Westinghouse Electric & Manufacturing Co. organization—this time for executive duties as assistant to the president to

take jurisdiction over many unrelated activities which the company's rapid expansion created faster than they could be departmentalized. As president of the Lackawanna & Wyoming Valley Railroad Co., he operated and was active in the financial reorganization and sale of the property. He was vice-president of the Niagara, Lockport & Ontario Power Co. until the Westinghouse interest in that utility was disposed of. He has continued to serve the company as an officer or director in many of its subsidiaries as well as to represent it on the boards of outside corporations. He toured Europe in 1913 in the interest of the Westinghouse foreign company holdings and in 1914-15 made a six months' survey of South America, skirting the entire continent. In 1917-18 he was incidentally occupied in the building of the Essington factories and new town of South Philadelphia in the Delaware River Valley.

Mr. Townley resides in New York City and belongs to the Engineers', Yale, Automobile, Scarsdale, Railroad and Bankers' Club.

ANNUAL CONVENTION OF SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION.

Big Three-Day Victory Meeting Held at Galveston, Texas, May 12 to 14.

The fifteenth annual convention of the Southwestern Electrical and Gas Association was held at the Hotel Galvez, Galveston, Texas, on May 12 to 14. The meeting was well attended. Secretary H. S. Cooper, of Dallas, sounded the keynote of the prevalent feeling among the members at the opening of the sessions when he explained that this was called the "Victory" convention, not on account of the great victory achieved by the Allies but on account of its being the first meeting held after the big success of the Victory Loan. Mayor I. H. Kempner of Galveston, in his welcoming address, elaborated on the idea of the "Victory" convention and said that all forces should be arrayed to insure an industrial victory as great as that of the Allied arms across the seas. Response was made by A. W. Houston, of Houston.

After a detailed explanation of the National Electrical Safety Code of the United States Bureau of Standards that was made by Milton H. Wagner, the association put itself on record with regard to same by unanimously adopting a motion along the lines of the following remarks by A. Hardgrave: "Although I don't believe this association could put itself on record as adopting this Code, yet I think the association should put itself on record as favoring bringing our distribution systems and our power plants up to a higher standard, and I move that it be the sense of this meeting that it is recognized that we should work to a higher standard as a matter of self-preservation and that therefore those stations who have not adopted the standard should obtain a copy of this bulletin with a view of bringing their systems up as far as possible or conditions will permit to that standard."

The following new officers of the association were elected for the ensuing year: Burr Martin, president; A. Hardgrave, first vice-president; C. E. Corder, second vice-president; Alber H. Warren, third vice-president; H. S. Cooper, secretary; J. B. Walker, treasurer.

The new Executive Committee consists of Burr Martin, A. Hardgrave, C. E. Corder, Alber H. Warren, H. C. Morris, R. Meriwether, S. R. Bertron, F. D. Murphy, W. B. Tuttle, G. H. Clifford, A. F. Townsend, C. H. Courser and Howard Smith.

The Advisory Committee is composed of H. O. Clarke, K. L. Simmons, F. L. Weisser, H. E. Danner, B. F. Cherry, A. Patterson, W. E. Wood, D. G. Fisher, James P. Griffin, J. W. Dawley, R. J. Irvine, J. W. Carpenter, H. E. Bolton, A. W. Houston, H. A. Dietz, F. R. Lawton, W. A. Douty, V. W. Berry, R. G. Soper, R. C. Jones, R. W. Van Valkenburg, C. W. Davis, H. E. Hobson, F. G. Quenet and C. A. Newning.

The Finance Committee includes J. E. Van Horn, R. G. Soper and C. H. Dickey.

Abstracts of the principal electrical papers presented will be published in an early issue.

MARCH ELECTRICAL EXPORTS ESTABLISH ANOTHER NEW RECORD.

Third Successive Month to Break Preceding Records—March Total Was Over $7,875,000.

Figures just received from the Bureau of Foreign and Domestic Commerce, Washington, D. C., show that the electrical exports from the United States totaled in value $7,876,353, or about 4.1% above the February total, which was nearly 13% higher than that of January, which in turn was nearly 9% above the preceding record of November, 1918. The March total was also over 52% greater than that of March of last year. Classified figures for last March and for the corresponding month of 1918 are given in the following table:

Articles.	March, 1919.	March, 1918.
Batteries	$ 579,708	$ 289,251
Carbons	98,923	181,617
Dynamos or generators	390,765	269,409
Fans	269,934	65,643
Heating and cooking apparatus	151,693	31,553
Insulated wire and cables	1,025,867	550,738
Interior wiring supplies, including fixtures	172,622	129,703
Lamps—		
Arc	308	2,001
Carbon-filament	14,039	8,840
Metal-filament	426,128	236,817
Magnetos, spark plugs, etc.	321,499	318,335
Meters and measuring instruments	273,373	125,207
Motors	838,448	785,233
Rheostats and controllers	38,565	29,429
Switches and accessories	225,305	222,338
Telegraph apparatus, including wireless	60,186	15,429
Telephones	255,154	368,338
Transformers	449,077	203,446
All other	2,284,759	1,334,087
Total	$7,876,353	$5,167,412

The above figures do not include electric locomotives, which are separately listed; during March, 1919, there were shipped 7 of these locomotives valued at $35,687. The total value of electrical exports, exclusive of electric locomotives, for the 9 months of the fiscal year begun last July was $54,271,807; for the corresponding 9-month periods ended March 31 in 1918 and 1917, it was $39,941,110 and $36,992,204, respectively.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS PRESENTS EDISON MEDAL.

Benjamin G. Lamme, Chief Engineer of Westinghouse Electric & Manufacturing Company, Accepts the Medal in a Modest Address.

The annual meeting for announcing the election of officers and receiving the report of the Board of Directors of the American Institute of Electrical Engineers and for the presentation of the Edison Medal was held in New York City on May 16. A

very large audience, attracted by the ceremonies incident to the presentation of the medal, assembled to view the event that is arranged annually in recognition of meritorious attainment of an electrical engineer. The custom of the annual award of the medal was begun in 1904 not only as a tribute to the achievements of engineers to come but also as a tribute to the attainments of Thomas Alva Edison, whose name the medal bears.

After hearing the report of the Board of Directors and of the tellers on the election of officers, Dr. A. E. Kennelly made a few brief but appropriate remarks and unveiled a bronze tablet to William D. Weaver. The tablet was presented as an appreciation by the Institute of Mr. Weaver's services to it in years past. Mr. Weaver, who was an engineer in the United States Navy and later editor of *Electrical World*, was closely identified with the Institute for many years. Among his most appreciated and significant efforts in behalf of the Institute were his efforts to establish its library. It was largely through his influence and persistent work that the excellent library was established.

A review of the activities of the Edison Medal Committees since the conception of the idea of the medal was presented by Carl Hering, chairman of the committee. The idea of the medal had its birth when, in 1904, 24 engineers, friends of Mr. Edison, formed the Edison Medal Association, and subscribed $5000 as a fund to be held in trust in perpetuity. The income from the endowment is to be devoted to some means of recognition of professional attainments of engineers of the United States and Canada, and to serve as a stimulus to scientific research. Articles of incorporation provide that no change in the name of the medal shall be made. The first award of the medal was in 1909 to Elihu Thomson. Medallists since 1909 have been Frank J. Sprague, George Westinghouse, William Stanley, C. F. Brush, Alexander Graham Bell, Nikola Tesla and John J. Carty.

"Achievements of Benjamin G. Lamme" was the title of an address by B. A. Behrend. His address was particularly interesting on account of his intimate acquaintance with Mr. Lamme acquired through several years of personal association. Mr. Lamme was graduated from Ohio University before electrical engineering was a profession and was offered a position in the Westinghouse works after graduation. His first duties consisted in polishing brass on the dynamos in the works. During his 30 years of service with the Westinghouse Electric & Manufacturing Co. he has taken out 159 letters patent. His developments include the synchronous converter, the 60-cycle converter, the single-phase induction railway motor, the 25-cycle railway motor used largely in Europe and in America, and numerous other power generating and converting devices. He instituted and developed the methods of calculation and design employed by the Westinghouse company. Mr. Lamme's philosophy of attainment is summed up in a famous statement of his that persistency is more successful than brilliancy of intellect.

Vice-president W. B. Jackson then presented the medal with brief appropriate remarks. Mr. Lamme's response modestly referred more to the sequence of generator and motor development than to his own attainments in connection therewith. The extreme infancy of the development of the electrical industry when he entered the service of the Westinghouse company is represented by one of his statements regarding the matter of the design of generators as it was understood and practiced at that time. Mr. Westinghouse heard soon after Mr. Lamme entered the service of the company that Mr. Lamme could "figure." He promptly sent for Mr. Lamme and, upon expressing the conviction that dynamos as well as other engineering appliances could be "figured," asked Mr. Lamme to undertake to make calculations for a new dynamo. The result of the computation was the single-reduction-gear, four-pole series-wound, street-car motor with slotted, machine-wound armature and 1/16-in. mica insulation that is, in an improved form, used at the present time. The design of the motor is remarkable when one considers the fact that the average life of electrical appliances in the past has been ten years or less. Mr. Lamme expressed the opinion that the possibilities of electrical development are as great now as they have been in the past.

SOCIETY FOR ELECTRICAL DEVELOPMENT HOLDS ANNUAL MEETING.

The annual meeting of the society for Electrical Development, held at its offices in the Engineering Societies Building, New York City, May 13, brought to light the interesting fact that notwithstanding the handicap of the war, the society has accomplished a tremendous amount of development work. The main feature of the report was the review of the work done and an outline of the greater activities which the proposed expansion of the society will permit. J. Robert Crouse, vice-president of the society, presided at the meeting.

Members of the Board of Directors were elected as follows: Representing manufacturers, W. D. Steel, four years; representing jobbers, E. C. Graham, four years; representing contractors, James R. Strong, four years, Fred B. Adam, two years; director at large, Charles W. Price, president, ELECTRICAL REVIEW Publishing Co., two years.

An extensive summary of Mr. Wakeman's report which was presented at this meeting will appear in an early issue.

Speaking of the "Electrify Your Home" campaign, recently conducted by the society, R. B. Woolley, of the society's staff, stated that the cities where the campaign was conducted on a co-operative basis showed the largest results ever obtained. Chicago, Cleveland, Brooklyn, and other cities, were mentioned where the results in actual house-wiring contracts closed have broken all records. Mr. Woolley also spoke of favorable replies received from 300 newspapers to an inquiry whether they were interested in national campaigns such as the society conducts. Only two newspapers went on record as expressing unfavorable opinions.

James H. McGraw moved a resolution of appreciation of the work of Mr. Wakeman and the staff based on the fundamental purpose to advertise the electrical industry to the public. This was passed. J. Robert Crouse claimed that the support given by the industry to the work of the society is altogether too small. Starting originally to get $200,000 annually, it was figured that this was the minimum on which the society could be conducted. Mr. Crouse said that he personally never had any idea but that the amount would grow gradually. He believed that $400,000 or $500,000 would be required to give adequate support to the work. He declared that the work done so far had produced excellent results and that it was absolutely logical that the industry would express itself as a unit in favor of the society and a still broader, bigger continuance of its activities.

Operating Practice

Cooling of Turbine Blading—Plugging Up Cable Ducts—Cable Truck Serves Many Purposes—Stopping Infiltration

COOLING THE BLADING OF TURBINE FLOATING ON THE LINE.

San Diego Consolidated Gas & Electric Company's Practice at Stand-by Station.

When steam turbines are "floated" on the line, in readiness to pick up load on short notice, it is, of course, necessary to pass sufficient steam through the machine to permit of keeping the temperature of the blading from attaining too high temperatures. It is important that sufficient steam be admitted to keep the blading cool; on the other hand, it is likewise desirable that no more steam than is actually necessary is used. Sometimes a sufficient quantity of steam leaks through the controlling valves and packing to keep the temperature below the maximum considered desirable. In other cases steam must be admitted through special inlets, as by-passing the controlling valves.

The San Diego Consolidated Gas & Electric Co. in their stand-by station at San Diego have installed Bristol recording thermometers on each turbine so that these instruments record the temperature attained in the last diaphragm. In those units where leakage of steam through the controlling valves and packing does not suffice to keep the blading cool, a small pipe has been installed. For the 4000-kw. turbines a ¼-in. dia. pipe was tried but this proved too small to keep the blading temperatures down to the required value of 250° F. and the admission of steam at intervals by manipulation of the valves has been resorted to. The recording thermometers indicate when the necessity for doing this arises.

It is intended to increase the size of pipe so that the blading of the machines will remain cool with floating for indefinite lengths of time. According to L. M. Klauber, superintendent of construction of the company, it is a desirable practice to allow a small leakage of steam through the blading of turbines in stand-by stations, as doing this enables a machine to be started up on short notice without introducing dangers due to unequal expansion that may otherwise occur.

ADVANTAGES AND DISADVANTAGES OF THE PLUGGED CABLE DUCT.

Some Questions on Ventilation, Flooding, Etc.

By B. M. Smith.

Of problems regarding underground distribution matters pertaining to increasing reliability, reducing breakdowns, increasing summer current-carrying capacity, etc., have received much attention before and more especially during the war. It is desirable and probable that underground construction and engineering will continue to receive attention from the best talent available among operating companies because the cost of this work and the investment involved are so high.

As so often happens, some small and apparently unimportant practice, done without giving the matter much consideration, may play a part that turns a failure into a success, or *vice versa*. In underground transmission of electrical energy there is one little matter that has to do with the current-carrying capacity of the cables, with manhole fires, with ventilation and with flooding. Yet this matter has received practically no attention from the technical press and the writer does not recall having heard it discussed before any of the engineering meetings of societies or those held by company departments. This matter deals with whether the vacant ducts of underground cable lines should be left vacant or whether they should be plugged up until required for cable.

Why might it be desirable to plug up vacant ducts? What are the objections to plugging them up if there are any objections? These are the questions that the underground foreman wants to know, and for this reason a brief statement as to the pros and cons of the case may be of use and may help to bring out some discussion of what is the general practice among the larger companies.

Reasons for Plugging Vacant Ducts.

If a duct line is built and some of the ducts remain without cables being pulled into them, silt and seepage is prone to flow from manhole to manhole, according to the grade. With changeable climatic conditions, this silt will probably dry up, leaving the duct or ducts not containing cables filled and choked instead of vacant. This choking of vacant ducts causes many troubles and delays in pulling in cable.

Vacant ducts offer a free channel for the flow of water from manhole to manhole. While the vacant duct may result in several manholes being flooded instead of one, they may also enable several manholes to contain a small amount of water instead of one or two to be filled. It depends upon circumstance, as regards water, therefore, whether it is advisable to plug or allow to remain open, vacant ducts.

Manhole fires are not uncommon. A cable breaks down and a fire once started is often able to persist for a long time. Paper insulation, well impregnated, burns rapidly and this may be possible and may even be encouraged when gas from leaky gas mains is present. The plugged vacant duct prevents gas from traveling from manhole to manhole, tending to isolate gas explosions and manhole fires. In this same connection it can be stated that a manhole fire cannot exist for any length of time when there is no air to support combustion. One, in fact the chief, source of air to support fires in manholes is through vacant ducts. Many tenacious fires in manholes have been traced to a leakage of gas from adjacent manholes, the gas reaching the location where the arc from a cable breakdown started a fire. Vacant and unplugged cable ducts are responsible for manhole covers being blown off a number of manholes simultaneously, when a cable breaks down in one of them. Every city like

Chicago, New York, etc., has had experiences where anywhere from a few to twenty manhole covers have been blown up in the air within a few minutes of each other.

Manhole fires while not common when the number of manholes in existence, do occur. But they occur so infrequently that special precautions against them may not appear universally justified. However, there is an argument against plugging the vacant duct that applies to practically every underground system. That is the argument of ventilation. The vacant and open ducts act as channels through which air circulates, following the same laws that govern the escape of gases from a boiler room through a stack, namely, that the greater the temperature difference the greater the draft and circulation of air. If vacant cable ducts are plugged up, cables will run hotter than otherwise, although of course the duct line may have been designed for all ducts, have cable pulled in and loaded simultaneously.

A number of companies, as pointed out in previous issues of the ELECTRICAL REVIEW, use mechanical blowers to force air through cable ducts to increase their current-carrying capacity during the summer. Other companies circulate water during the hot weeks. These things could not be done were vacant ducts plugged up and the ducts containing cable closed up also.

In brief, the reasons for plugging up ducts not carrying cables are to prevent dirt and silt from plugging them up, to prevent the passage of gas and explosive mixtures along the duct line from manhole to manhole, prevent air from supporting a manhole fire should one start and reduce flooding locally. The reasons advanced against plugging up vacant ducts and the spaces around ducts containing cable are that to do so lowers the rate at which heat can be dissipated, since air is a magnificent insulator and it is stagnant when each end of a duct is plugged, and the benefit of whatever water happens to trickle along a duct is not utilized. The decision must be made after considering the likelihood of fires and explosions, which depends upon the density of the pipes in the street, etc., and the design of cable duct. Obviously, a duct built two wide and six or more high will not benefit from having a few open vacant ducts to the same extent that will a duct line built six wide and six high because of the difference in temperature gradient.

There are many ways of plugging a vacant duct or duct containing a cable. Some men plaster up the duct with mud, a practice more commonly used for a duct containing a cable. Some men use rags, which are stuffed into the duct. Two pieces of wood are employed, cut circular, the one side to fit the duct, the other to fit the cable sheath snugly to plug a duct where a duct contains a cable, but in one piece where the duct is vacant. Sometimes a piece of a rag is placed between the plug and the duct to make a snug fit.

CABLE-PULLING TRUCK SERVES MANY PURPOSES.

Interesting Arrangements Used by Detroit Edison Company.

The Detroit Edison Co. is using a 5-ton truck equipped for pulling cable into underground conduits. This truck is intended for use in installing cable in the suburban villages and cities which are out of the mileage range of the electric operated trucks now in use. For this reason the truck is equipped with a stormproof top capable of housing ten or twelve men, making it suitable for long trips under adverse weather conditions.

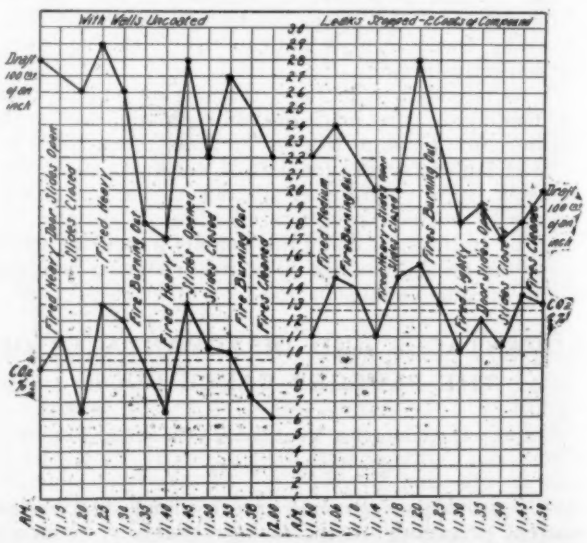
In ordinary work the reels of cable are delivered on the job by the Stores Department, but for emergency trouble jobs in suburban towns it was decided to provide room to carry two reels of cable on the truck platform, in addition to providing a suitable protection for the men, and for this reason all tool boxes are installed under the platform and seats. Each cable reel is mounted upon a pair of wheels for rapid manoeuvering.

A Bay City power winch direct-connected to the transmission of the truck furnishes the power for pulling the cable, loading, etc. The winch is so located that it can also be used to pull the truck out of mud holes in case it becomes necessary to make trips under bad road conditions. The top is made so it can be easily removed to permit the truck being shipped by railroad or boat if necessary.

All the compartments for tools, push rods, cable grips, ropes, jacks, etc., are provided with locks. These compartments occupy space which ordinarily is of no use on the standard truck chassis.

EFFECT OF AIR INFILTRATION UPON FURNACE PERFORMANCE.

The importance of maintaining a high percentage of CO_2 by correct firing, correct air supply and reducing air infiltration to a minimum have been so widely discussed as to need little further mention. That air infiltration, which means air drawn into the furnace chamber and the passes of the boiler through cracks in the brickwork, crevices between iron work and brick and open doors, etc., is a powerful factor in lowering furnace temperatures and wasting coal, is understood. On the other hand, this much-discussed subject of air infiltration loses some of its meaning through frequent discussion, and engineers are apt to



Effect of Coating Furnace Setting with Vulcan-Lastite Compound.

forget, or not realize how objectionable it really is.

The accompanying diagram shows the results of a test made recently upon a boiler where air infiltration was occuring. This diagram shows the draft and carbon dioxide obtained by the same fireman and

grade of coal with the brickwork before and after painting with special compound for sealing up cracks and crevices.

This curve shows that the CO_2 was increased from an average of 9.6 to 12.7%, an increase of 3.1%, representing a reduction of the preventable waste from 6.4 to 2.2%. This is equivalent to a fuel saving of 4.2%.

There are so many variables in boiler-room operation, that it is at best difficult to maintain uniform results. The size of coal, the rate of firing, degree of moisture, condition of heating surfaces inside and outside all combine to affect combustion efficiencies and boiler economy. But there is little excuse for not taking those precautions that are more or less permanent in result. Painting furnace settings so as to prevent air infiltration, covering steam pipes with heat-insulating materials, and treating the boiler feed-water, these are some of the things that can be done toward making boiler-room operation efficient.

PRACTICAL EXPERIENCE WITH HIGH-VOLTAGE INSULATORS.

Discussion of N. E. L. A. Report by California Operating Engineers.

The practices of seven large companies operating transmission lines on the Pacific Coast were described in the May 10 issue of the ELECTRICAL REVIEW. The report of the insulator committee at the N. E. L. A. convention brought out some pertinent information as to operating experiences among some of the most prominent men connected with long-distance transmission on the Pacific Coast.

C. O. Poole of the Southern Sierras Power Co. stated that it was his opinion that the daily and annual cycle of temperature changes were responsible for a large part of those insulator failures not directly caused by outside physical reasons. His experience has been that out of some 10,000 to 15,000 insulators that 98% of the failures occurred between the end of the pin and cap and that this was due to the expansion of the pin. He noted a particular batch of insulators manufactured in 1904 which had been given years of service at 35,000 volts and then placed in operation on a 55,000-volt line in a very hot climate. During the last five years there has been but one failure in this batch of pin-type insulators.

J. P. Jollyman, Pacific Gas & Electric Co., stated that in his opinion much better results would be obtained by a higher factor of safety in line insulators by the use of additional units, since the cost of the insulators themselves was a small part of that of a steel tower transmission line. He mentioned his experience with insulators made in 1912 and that he had experienced no failures on 100-kv. lines and but very few on 60-kv. lines. On pin-type insulators the percentage of faulty insulators during a 12-year period was given as 5%. These insulators were of 4-part construction. These failures or faults were not discovered in any one particular part of the insulators but were distributed. He advocated the use of less severe tests on old insulators as they have shown that they are capable of insulating a line, hence should not be broken by testing at extreme voltages.

R. S. Masson, Arizona Power Co., referring to the Hewlett type of insulators, gave it as his opinion that one reason why he had experienced such satisfactory results with them was that there was a less mass of metal between discs and as a consequence the units nearest the line did not have to do all the work.

J. A. Lighthipe, Southern California Edison Co., stated that he had made some experiments on the Hewlett insulators on a short stretch of 60-kv. line and that there had been no failures in these insulators during the 6 years of the test. R. S. McClelland, Electric Bond & Share Co., New York, stated that the Colorado Power Co. has made extensive use of the Hewlett insulators and that since 1906 they have been almost entirely free from failures.

J. E. Woodbridge, Sierra & San Francisco Power Co., stated that there was one need of good insulators not ordinarily noted and that was that in many cases it was practically impossible to take a line out of service for the purpose of making any tests on the insulators due to the nature of the load. He indicated that more money might be spent to obtain insulators which could be guaranteed as being better in order to avoid the construction of additional lines. C. P. Osborne, Portland Railway, Light & Power Co., stated that his company made annual tests with the megger on all transmission line insulators and required them to pass a 200-megohm test.

STATION CONTROL WIRING AT ROCHESTER.

Wiring Refinements Followed by Rochester Railway & Light Company.

In its recent work the Rochester Railway & Light Co. is following some meritorious practices in installing the control wiring from the switchboards to the apparatus by which, among other things, any of the large number of wires can be readily picked up without it being necessary to handle a large number of wires not wanted.

The switchboard supports consist of 3 by 1½-in. channel irons, which support the panels by iron castings with a space of about 3 in. between. Cross pieces are fastened across the open side of the channel, flush with the edges to which covers of sheet iron or steel about 3 by 1/16 in. are screwed. All control wires are carried in these channel iron frames. To pick up any wire, all that it is necessary to do is to remove the channel-iron cover and the required wire can be picked up after perhaps pushing to one side adjacent wires.

The company finds 3-in. channels have somewhat larger capacity for wires than 1¼-in. conduit. In fact, the 3-in. channels hold about 40 No. 12 wires without undue crowding. A still further advantage of channel iron is that if additional space for carrying wires is required, another similar channel may be placed face to face with the one already installed and by replacing the sheet-iron cover, double the capacity. A still further advantage of this type of support is that outlets may be easily made at any location after installation. Moreover, conduit cutting and threading are obviated and the possibility of outlets being in the wrong place or too few in number does not enter the problem as it does when using pipe supports. It has been found that the use of channel-iron supports cost about $80 per panel less than when conduit is used.

The control wiring consists of No. 12 wire, varnished cambric insulated and covered with an outer braid of cotton painted with gray fireproof insulating paint. No joints or splices are made anywhere except where the wires come in the channel supports where the splices are readily visible and accessible. As nearly all wiring troubles develop at the joints, this practice is a worthy one.

Contracting-Construction

Handy Tools for Electrical Men—Massachusetts Contractors' New Code of Practice — Big Theater Job Started

HANDY TOOLS FOR ELECTRICIANS AND MAINTENANCE MEN.

Methods of Construction and Application of Several Handy Home-Made Wiring Devices.

By James A. Perry.

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This is the second of a series of four articles describing the uses and construction of a number of handy tools for use by electricians. Although some of these descriptions have appeared in previous issues of the Electrical Review *and other journals, they are compiled in this series with others in a very convenient form which adds greatly to their value and for reference purposes. The first of these articles describing several practical devices for the plant electrician appeared in our issue of May 17.*

A useful little kit for carrying around small tools and fittings, such as cleats, bushings, rosettes, locknuts and washers, can be made from a 100-lb. nail keg, as shown in Fig. 6. The keg is sawed in two at the middle, except that one stave, in which notches are cut for

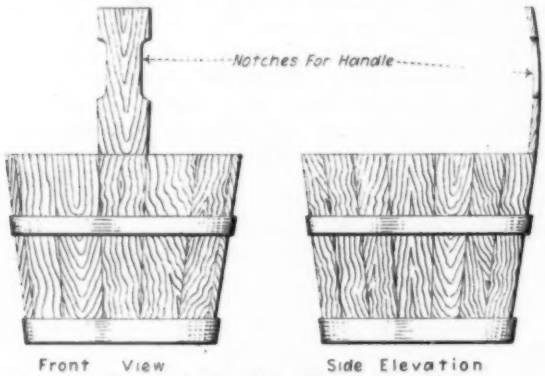


Fig. 6.—Carrier for Miscellaneous Supplies.

a handle, is allowed to extend. Some wiremen use half a dozen or so of these carriers on every big job, using each one for some different class of material.

A wireman should never erect wire in an open-work installation until all of the kinks or bends have been taken out of it. These bends can, of course, be eliminated if sufficient tension is put on the wire after it is up, but it is much easier and cheaper to straighten the wire before it is placed in the cleats. One good method of straightening wire is shown in Fig. 7. One end of the wire is attached to a nail driven in some stationary substantial object. A knob is run over the wire and then held at an angle and drawn the entire length of the conductor as indicated in the illustration. It is necessary to maintain some tension on the wire while the knob is being drawn along it. This method is best used for No. 14 or No. 12 wires and may not be successful with larger ones.

There is probably no tool that an electrical worker uses more frequently than he does his pocket knife. If he has its blades ground as shown in Fig. 8, a great deal of time and worry will be saved. One of the smaller blades can be ground on an emery wheel, as

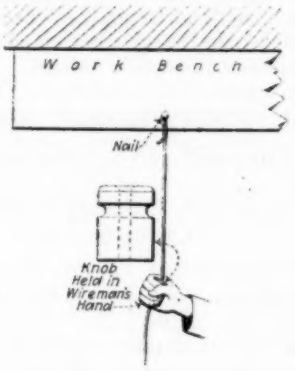


Fig. 7.—Straightening Wire with a Knob.

shown at *A*. The end is formed to a screw-driver point of suitable size for socket and rosette work. Near the bolster a notch is cut in the blade. With this notch, fixture wire can be "skinned" very rapidly and without breaking it, after the wireman has had a little practice. In use, the end of the wire is placed in the notch and the knife pulled along the wire. The insulation will soon come off.

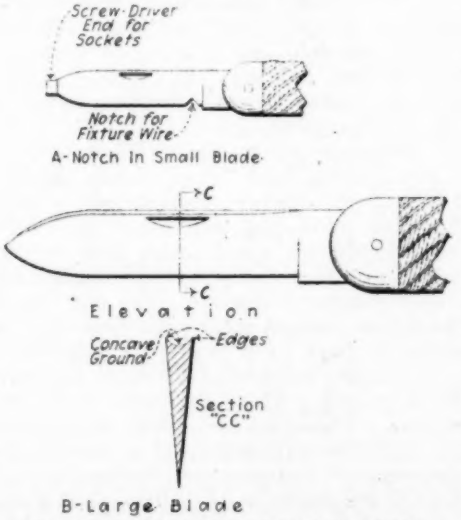
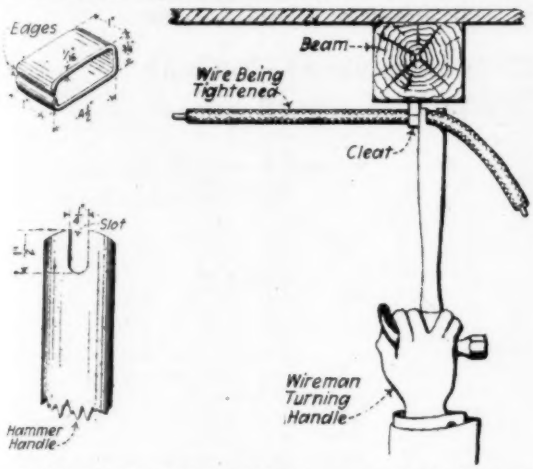


Fig. 8.—Methods of Grinding Knife Blades.

The large knife-blade that is used almost exclusively for "skinning" wire can be ground, as shown at *B*. As all wiremen know, it is impossible to keep a blade sharp if it is used for scraping insulation, and also for cutting it off. With the grinding suggested, the lower edge can be kept quite sharp and used only

for cutting the covering, while the concave ground upper surface, which provides two edges, is used for scraping or brightening the wire, after the insulation has been removed. These concave edges are formed by cutting a groove along the top of the blade with an



Figs. 9, 10 and 11.—Tool for Skinning Lamp Cord—Application of Slotted Hammer Handle—Dimensions of Slot.

emery wheel. The edge of an electrician's knife will usually ultimately assume a curved contour instead of the straight edge shown in Fig. 8, *B*, due to constant sharpening. It will be found that if the knife blade that is used for cutting insulation is ground out rounding as soon as the knife is obtained, it will tend to prevent the blade from slipping off the wire.

A little tool, very useful for "skinning" lamp cord, can be made as shown in Fig. 9. In use, the lamp

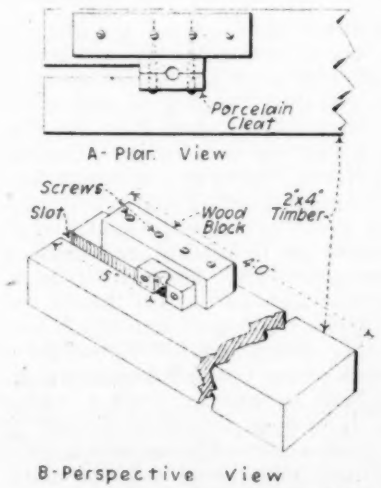


Fig. 12.—Device for Tightening Wire.

cord is held between the two edges, twisted around therein to cut the insulation around its entire circumference and then the tool is pulled. The insulation—both the braid and the rubber—will come with it, and the strands will not be broken if the wireman uses just the right amount of pressure on the tool. It can be formed from a strip of steel or iron plate. The edges can be made sharp with a file.

No. 12 and 14 wire, in cleat work, can be tightened very nicely by the device shown in Figs. 10 and 11. A slot, ½ in. deep and ¼ in. wide, is cut in the end of the hammer handle, at right angles to the head. The slot being cut, the handle is used as shown in Fig. 10. All wires should be straightened as suggested in a preceding paragraph. After they are partially erected the sag in them can be pulled out with the hammer handle.

The operation of tightening is as follows: The conductor is fastened by clamping in one of the cleats at the far end of the run. Then at the near end of the run a cleat is installed and the wire placed in it. The screws are set up only far enough so as to bind the wire after it is pulled through and to prevent it from slipping back. Then the end of the wire is inserted in the slot of the handle and the hammer is turned toward the center of the cleat. The slack being drawn out, the cleat can be fastened with a screw-driver. After the wire has been drawn taut, intermediate cleats can be installed. It will be noted that this procedure elim-

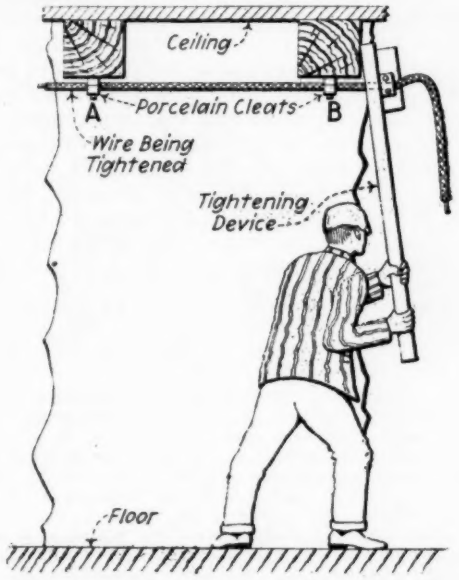


Fig. 13.—Application of Wire Tightening Device.

inates the necessity of lining up the intermediate cleats by measurement.

Where wires heavier than No. 12 or No. 14 are being installed in cleats, a tightening device, arranged somewhat as shown in Figs. 12 and 13, will be useful. Aside from the fact that it is a time saver, this arrangement has the advantage that the conductors can be pulled very taut without the damage to insulation which usually occurs when an endeavor is made to tighten conductors with pliers. The device comprises (Fig. 12) a 2 by 4-in. lever, about 4 ft. long, with a slot cut in its end. Adjacent to and parallel with the slot a block, possibly 5 in. long and 2 in. square, is fastened with flat-head wood screws. A cleat is screwed to this block as shown. This cleat may be either of porcelain, similar to those being used on the job, or preferably it can be cut out of wood (maple) or hard fiber. The wire hole in the cleat should lie directly over the end of the slot.

In using the lever, its upper end is placed against a beam or some other member of the building that can be used as a fulcrum, and the conductor is firmly clamped in the cleat. Pressure on the lever tightens the conductor. If the conductor cannot be drawn sufficiently tight with the lever in its first position on the beam which forms the fulcrum, the upper end of the fulcrum can be blocked out from the beam, whereby ample leverage can be provided.

(To be continued.)

NEW CODE OF PRACTICE ADOPTED BY MASSACHUSETTS CONTRACTORS.

Boston District Code Contains Several New Provisions—Chicago Estimators' Overhead Curve Adopted.

The Boston district of the Massachusetts State Association of Electrical Contractors and Dealers held a meeting on May 15 at the Boston City Club. At this meeting several important committee reports were presented including the report of the Committee on the Building Trades Employers Association Electic Section and the Committee on Relationship with Engineers.

Attached to the announcements of this meeting was the new code of practice recommended by the Boston district to its members. This code, while substantially the same as that recommended by the National Association of Electrical Contractors and Dealers, differs radically from it in several of its provisions, namely, the first, second and fourth. Paragraph 12 has also been expanded to provide that the percentage of overhead expense to be charged shall be determined from a table which is added to the code. The percentages shown in this table are the same as those drawn up by the Chicago Electrical Estimators Association which appeared in a previous issue of the ELECTRICAL REVIEW. The new code of practice is as follows.

A CODE OF PRACTICE FOR ELECTRICAL CONTRACTORS RECOMMENDED BY THE BOSTON DISTRICT OF THE MASSACHUSETTS STATE ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS.

1.—That the electrical contract be a separate and distinct contract with the architect, engineer or owner and not a subcontract under a general contractor.

2.—That, in the interest of service to the owner, provision be made in the contract permitting the electrical contractor to receive payment for all material required for the job which is delivered on the site of the work.

3.—Each contract shall provide for the prompt payment and require final inspection and payment in full within 30 days of the completion of the work covered by said contract, regardless of the final settlement for the building as a whole or for the work of any other trade.

4.—To insure unit responsibility for the entire electrical work that everything pertaining to the electrical equipment be included in the electrical contract, such as motors, compensators, generators, main switchboard, lighting fixtures and such other apparatus as may be contemplated for the complete equipment.

5.—The standard form of contract of the American Institute of Architects is to be the basis used for all bids unless otherwise mutually agreed upon.

6.—The contractor shall not be responsible for loss due to any delay in the execution of the contract when such delay is in no way the fault of said contractor. The time lost by reason of strikes, lockouts, fire, washouts, delays by transportation companies or any other cause over which the contractor has no control will be added to the time of completion of the work by the contract.

7.—The contractor does not estimate on or include any charges for cleaning, removal of rubbish, patching or repairing of plaster, brick or terra cotta work, breaking of glass, office or telephone service, water, light, heat, fire insurance, use of general gangway, scaffolding, use of hoisting facilities, stenographer, watchman, erection of temporary structures, enclosures or stairs, or any other similar charge, unless mutually agreed upon in advance.

8.—The contractor shall not be required to cut any work except his own and shall not be required to cut, alter or remove his own work if due to any cause for which he is not responsible.

9.—If the regular and normal charges of the work is held up due to extras or changes or any other causes over which the contractor has no control, an interference or interruption charge shall be made, depending on the extent of the interference or interruption.

10.—A fair price will be charged for drafting or engineering services when the contractor is called upon to render such services.

11.—The contractor shall not include temporary work in his estimate unless the quantities are distinctly stated. In no case should it be included in an estimate maintenance or cost of current except on a percentage basis.

12.—"Cost" shall be understood to mean cost of material and labor and the administrative or overhead expense of the contractor, and shall be determined as follows:

The overhead expense depends upon the amount of the work and is to be computed as follows:

A	B	A	B
$ 200	52.0	$ 2,900	25.4
250	48.5	3,000	25.0
300	46.5	3,500	23.6
350	45.3	4,000	22.5
400	44.0	4,500	21.7
450	43.0	5,000	21.0
500	42.0	5,500	20.3
550	41.2	6,000	19.7
600	40.5	6,500	19.2
650	39.8	7,000	18.7
700	39.2	7,500	18.2
750	38.5	8,000	17.8
800	37.9	8,500	17.4
850	37.4	9,000	17.0
900	36.9	9,500	16.6
950	36.4	10,000	16.2
1,000	36.0	11,000	15.5
1,100	35.0	12,000	15.0
1,200	34.2	13,000	14.7
1,300	33.4	14,000	14.5
1,400	32.7	15,000	14.3
1,500	32.0	20,000	13.2
1,600	31.3	25,000	12.2
1,700	30.7	30,000	11.5
1,800	30.1	35,000	11.0
1,900	29.5	40,000	10.8
2,000	29.0	45,000	10.6
2,100	28.5	50,000	10.4
2,200	28.0	60,000	10.0
2,300	27.6	70,000	9.6
2,400	27.2	80,000	9.3
2,500	26.8	90,000	9.1
2,600	26.4	100,000	9.0
2,700	26.0	130,000	8.7
2,800	25.7	160,000	8.5

A being price of material and labor delivered on job. B being percentage of overhead.

LARGE THEATER NOW BEING BUILT IN CHICAGO.

Many Novel Electrical Features Being Developed by Hub Electric Co. for This Installation.

The construction of one of the largest moving-picture theaters in the country has just been started at the corner of 63rd street and Union avenue, Chicago. It will have a seating capacity of 4000 people and is expected to be completed about Nov. 1. The contract for the entire electrical installation, including fixtures, motors and wiring, amounting to about $30,000, has been awarded to the Hub Electric Co., 1819 Carroll avenue, Chicago. The connected load when completed will be about 80 kw. in lighting and 100 hp. in power.

This installation when finished will be one of the most complete and modern of any theater erected thus far. The interior lighting system which has been designed for this installation will consist of concealed, changeable-color units controlled by motor-driven dimmers which will be operated from a remote switchboard. This system, which is already practically perfected, gives a very striking and beautiful effect. In addition many other novel and interesting features are being developed for use in this theater among which is an elaborate system for ventilating and cooling and washing the air.

PENNSYLVANIA STATE ASSOCIATION HOLDS QUARTERLY MEETING.

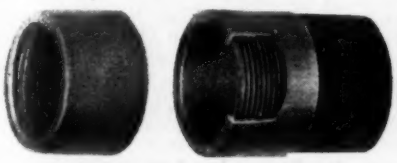
The Pennsylvania State Association of Electrical Contractors and Dealers held its quarterly meeting May 14 at the Hotel Allen, Allentown, Pa. This meeting was open to all branches of the electrical industry and was featured by interesting addresses on cost accounting, electrical merchandising, proposed legislation and other important subjects, and concluded with an electrical industry dinner.

New Appliances

Conduit Thread-Protecting Device—Unique Electric Tempering Furnace—Duplex Lighting Unit—Brass Connector

New Gyrovise Thread Protector for Conduit or Pipe.

A new device intended to protect the threaded ends of pipe has been developed by the Gyrovise Co. of Cleveland, Ohio. It is called the Gyrovise thread protector and consists of a steel tube with a reinforced flange and a few threads at one end, the balance of the tube being free to slide over the threaded pipe. It can be furnished for all pipe-tubing or casing from ¾ to 10 in. in diameter in a considerable variety of thread pitches.



New Protector for Threaded Ends of Conduit.

Although this device is very light in weight, the 2-in. size weighing 6 to the pound, it possesses the required strength to protect the thread. As the free end of the protector slides over the threaded pipe and holds the device in exact alinement, the possibility of cutting the pipe thread is greatly reduced. It may be attached to the pipe very quickly and it is claimed that it may be made tight enough with the hand to require a wrench or hammer to remove, which assures against its working off when the pipe is being handled. The flanged end on which is stenciled the size and pitch also protects the end of the pipe from damage.

Electric Tool-Tempering Furnace Using Fused Salts.

An electric tool-tempering furnace which uses the barium chloride and salt principle is proving highly successful in the South Philadelphia Works of the Westinghouse Electric & Manufacturing Co. The chief advantages of this type of furnace over those using gas, coke, oil or wood are constancy and ease of control of heat, cleanliness, equal heating of each particle of the specific part of the tool to be tempered, low cost of operation and excellence of the finished work.

The furnace is of simple construction. The outer shell is a cast-iron cylinder about 3 ft. high and 3½ ft. in diameter, which is packed with firebrick and occasionally a layer of asbestos. The circular reservoir in the center, which forms the operating part of the furnace, is 12 in. in diameter and 14 in. deep.

The heat is supplied by two pairs of electrodes, built in on opposite sides of the walls of the reservoir. The electrodes operate on a 16 to 30-volt alternating-current circuit which is controlled by a switchboard and transformer. Carbon sticks are first placed between the electrodes in the reservoir to complete the circuit.

The current is started on the 30-volt circuit. Salt is fed into the reservoir and when it is melted it acts as a conductor and completes the circuit. The carbon sticks are then taken out. A mixture of barium chloride and salt is then fed into the reservoir, the final proportion being about 60% barium chloride.

When the temperature of the liquid reaches 1425° F., the voltage is lowered. The current regulation at the switchboard gives a quick and easy method of control so that the temperature of the liquid can be held at any predetermined degree of heat required for each specific tool.

The liquid, by being kept at one temperature, heats the tool uniformly from surface to center and eliminates soft spots in the finished tool, which is seldom possible when a tool is exposed to a direct or indirect flame.

The furnace throws off very little heat so that it meets with the approval of the workmen. This also means high efficiency since substantially all the electrical energy supplied goes into the bath and very little is wasted externally.

Livingston Economy Light for Interior Lighting.

An interior lighting unit with several unique features has been placed on the market by J. Livingston & Co., Inc., Grand Central Terminal, New York City. Additional facts about this unit have been brought to our attention, supplementing those we described in a recent issue. This unit is known by the trade name "Livingston Economy Light," to emphasize that its use is economical both of money and of eyesight.

The upper of the reflectors is made of porcelain-enameled steel and the lower bowl is of an opal glass known as Celestialite. This diffuses the light that passes downward through it and also reflects part of the light to the outer surface of the large reflector. The major portion of the light is reflected upward by the large reflector toward the ceiling. Thus the unit gives three kinds of light distribution, two which are indirect and one direct.

This lighting unit has a pleasing outline. It is easily cleaned, and is furnished, either plain or decorated, for Mazda C lamps ranging from 75 to 500-watt sizes. Its design has been worked out to practically eliminate glare and at the same time to give a high efficiency of illumination. It can be used in a variety of interiors, the size and decoration being selected to suit the individual requirements.

This unit is licensed under the Duplexalite Corporation patents.

Sherman Brass Set-Screw Connectors.

The ordinary tubular connectors with set screws for clamping the wire or cable have been in use by electrical men for over a score of years and it seemed had reached perfection long ago. Quite recently, however, a brass-goods manufacturing company determined to add a line of these connectors to its products and before doing so undertook a study to see what improvements could be made in their construction without adding materially to their price.

Fig. 1.—Connector With Continuous Bore for No. 0 Solid or Stranded Cable.

As a result two types of connectors were developed. Fig. 1 shows one of the connectors with a continuous bore clear through and two set screws. These are suitable for either solid or stranded wire and cable from No. 12 to No. 0000 size. Fig. 2 shows one of the larger four-screw connectors with a dividing wall in the middle of the bore, making a separate receptacle for stranded cable at each end. These are made for No. 14 to No. 0000 stranded wires and cables. In each case the smaller sizes have two and the larger ones four set screws. All connectors are made from solid brass rod, accurately machined to size. The set screws are heavily galvanized and hence substantially rustproof. The connectors can therefore be kept in stock by the dealer for a long time without deteriorating and the purchaser can use them over and over again after removing from any temporary work.

Fig. 2.—Connector With Dividing Wall for No. 0000 Stranded Cable.

Each and every connector has its number stamped on its side to facilitate reordering without looking up the catalog number. These connectors are made by the H. B. Sherman Manufacturing Co., Battle Creek, Mich.

Trade Activities

Manufacturing Facilities of Crystal Washing Machine—Wheeler, Mechlin & Rhea Organize—Exhibits—Catalogs

Bittman & Battee, Inc., manufacturers' agent, 84 Second street, San Francisco, will represent the Hazard Manufacturing Co. of Wilkes Barre, Pa., manufacturer of steel and wire rope, electric wires and cables, etc.

Chicago Pneumatic Tool Co., 52 Vanderbilt avenue, New York, has completed negotiations for the purchase of property at 6-8 East 44th street, and is understood to be planning for the erection of a new two-story building on the site for its exclusive occupancy.

Templeton, Kenly Exhibit.—At the convention of the National Electric Light Association, held during the past week, Templeton, Kenly & Co., Ltd., Chicago, exhibited and demonstrated the No. 328 Simplex pole pulling and pole straightening jack. This jack was operated under actual working conditions, where its many features and its great operating facilities as a practical, economical and efficient tool for pulling and straightening telephone, telegraph, electric light and power poles were demonstrated.

Home Electric Appliance Co. has opened for business at 322 20th street, Rock Island, Ill., specializing in all kinds of electrical devices for the home, with daily free demonstrations.

Trimble & Follick Electric Co., Bloomington, Ill., has been organized by Paul E. Follick and Roy F. Trimble. The new firm will be located at 320 South Main street and will specialize in farm lighting. Mr. Trimble, one of the organizers of the company, has been head electrician for the Bloomington & Normal Railway & Lighting Co. for the past six years. Mr. Follick has recently been discharged from the aviation service of the army, where he served for 18 months as an electrician.

Brown Portable Conveying Machinery Co., 10 South La Salle street, Chicago, has issued Bulletin No. 2, describing Brown portable conveyors and elevators. The bulletin, which is illustrated and contains 48 pages, describes the many applications of the conveyors to the transmission of freight. The conveyors are electrically operated and are adjustable to deliver packages to different elevations and to different points on a floor. By means of a worm gear, certain types of the conveyors are adaptable to stacking packages and parcels in horizontal rows, as well as in tiers. The different types of the conveyors are designed to accommodate all kinds of freight, whether in barrels, boxes, sacks, rolls; whether in heavy or in light parcels; and whether the material in the parcels represents drygoods, nails, flour, sugar, wire, cement or anything else. The conveyors, which eliminate in some instances 90 per cent of the man power used before their installation, are adaptable to any situation in which freight is to be handled.

Thomas A. Edison, Inc., West Orange, N. J., has recently inaugurated classes for the study of the English language for employes of foreign birth at its local plant. The studies are under direction of Chester E. Taylor, Americanization Secretary of the Y. M. C. A. at Orange, N. J. Classes are held every Tuesday and Thursday afternoon, and the company will make an allowance of half pay to all employes for time spent in the studies.

Edison Electric Appliance Co., Inc., 5660 West Taylor street, Chicago, is sending to the trade very attractive broadsides of the G. E. and Hotpoint divisions. These describe in detail the plans of the company for national advertising of electric household appliances and gather together in a condensed form, reproductions in colors of the 1919 Spring advertising of the three divisions, G. E., Hughes and Hotpoint. A broadside of the Hughes Division is devoted to the Hughes electric range and hot water heater, and contains advertisements which will appear in the *Saturday Evening Post, Woman's Home Companion, American Magazine* and other leading periodicals during May, June and July. It also illustrates a splendid line of electric ranges, designed to meet the needs of the large as well as the small consumer.

Wheeler, Mechlin & Rhea, West Street building, New York City, have organized to furnish service to foreign and domestic clients purchasing machinery and engineering materials in the United States. This concern has made an extensive study of the markets of the United States and is enabled to procure for its clients the best American products. A partial list of products which the organization is prepared to purchase follows: General construction materials and plant; steam and electric railway materials, equipment and supplies; electric light and power apparatus and supplies; shop and factory equipment; harbor, wharf dredging and freight handling equipment; highway, street, sanitation and water supply plant and materials; mining and smelting plant equipment. The firm also arranges co-ordinated production programs for shipments from one or several manufacturing plants, follows production schedules at the factories by a follow-up system or correspondence and personal visits, and supervises inspection, packing and shipments by rail and water. Earl Wheeler, a member of the firm, has been director, department of electrical and mechanical engineering, engineer school, corps of engineers, United States Army; treasurer and general manager of the Electric Speedometer Co., Washington, D. C., and local manager of the General Electric Co., Washington, D. C. Another member of the firm is Frank Rhea, who has had an extensive experience in the railway engineering field both in railway work and manufacturing. A. O. Mechlin, associate member, as lieutenant commander, civil engineer corps, United States Navy, had charge of the construction of additions to the naval academy; the navy and munitions building, Washington, D. C. He was also in charge of the construction of shops, buildings, wharves, power plant, etc. He was formerly a member of the firm of Mechlin & Starr, architectural engineers, Washington, D. C.

A. B. Elektriska Armaturfabriken, Tyringe, Sweden, one of the largest Swedish electrical manufacturing companies, is seeking a representative in the United States to become sole distributor in this country for its line of electric lighting fixtures and lamps. These are made in copper, brass and iron, both plain and ornamental. The company states it has exceptionally good facilities for manufacturing economically and is ready to compete actively for American trade on the basis of price as well as quality.

The Cutler-Hammer Manufacturing Co., Milwaukee, Wis., has just published a new six-page envelope folder entitled "Melting Metal with Electrically Heated Pots." This folder calls attention to the advantages of electrically heated melting pots over gas and gasoline, on account of cleanliness, elimination of open flame, greater efficiency and ease of control. C-H electrically heated metal melting pots are made to melt down and maintain at the proper temperature all soft materials, such as lead, tin, solder babbitt, etc. They are limited to a maximum temperature of 555° F., and are made in standard sizes up to 150 lb. metal capacity. Two types are described in this new folder—the floor type being made in 10 and 25 lb. sizes and the bench type in 50, 100 and 150-lb. capacity. Automatic temperature control equipment similar to that used on electric linotype pots is furnished at the option of the purchaser with either of these two types. The automatic temperature control consists of a dynamic thermometer and the control panel. The bulb of the thermometer is immersed in the metal and the coil is set to the temperature desired. The action of the equipment is such that the metal is kept between a minimum and a max-

imum temperature, the current being turned on only when the temperature of the metal drops to the minimum. Prices, dimensions and other descriptive matter are included.

Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia, Pa., has prepared for distribution catalog No. 48 dealing with the measurement of conductivity of electrolytes. This publication is divided into four sections, the first of which is devoted to a discussion of Precision measurement of electrolytic conductivity and the use of Precision equipment in this connection. Another section treats with electrolytic measurements in industrial work and the development of apparatus for the utilization of commercial frequency of 60 cycles. A third division has to do with students' conductivity equipment and illustrates clearly the methods used in measurements of high precision. The remainder of the book consists of price lists on apparatus for measurements of precision, apparatus for commercial work and apparatus for students' work.

Exhibit of Johns-Manville Products.—One of the most attractive exhibits held by manufacturers at the convention of the National Electric Light Association at Atlantic City was that of the H. W. Johns-Manville Co., New York City, displaying asbestos wood, a product of particular interest to the electrical field. The rear wall of the booth was covered in a very attractive manner by large panels of Johns-Manville Transite and Ebony asbestos woods. Exhibited on a long table or counter, also finished in asbestos wood, was an entire line of "Noark" approved renewable fuses and links, standard service boxes and fittings, subway boxes, meter devices, fiber underground conduit and fittings, molded insulators and hard fiber sheets and tubes, etc. The special feature of this exhibit, which proved of wide interest, was an all-glass case showing asbestos in its various stages from raw mineral rock to finished product, indicative of the remarkable growth of the asbestos industry in recent years. Finished products of asbestos, such as packings, pipe coverings, roofings and building materials were also displayed. The entire exhibit was one of unusual interest and afforded electrical men an excellent opportunity to see and study all of the products through which the Johns-Manville company serves the electrical field.

Western Electric Organization Changes.—A number of changes in the organization of the Western Electric Co. will take effect June 1. These changes in the government and sales departments of the company are as follows: J. M. Skinkle, formerly connected with the engineering department, has been appointed assistant manager of the government department with headquarters at New York. J. A. Pizzini, for a number of years sales manager at the New York office, has been appointed assistant manager of that office. W. J. Drury, until recently manager of the Cleveland house of the company, will succeed Mr. Pizzini as sales manager at New York. A. M. Collins, formerly sales manager of the Detroit office, succeeds Mr. Drury as manager of the Cleveland house. A. R. Maynard, until recently connected with the sales department in Chicago, has been appointed sales manager at Detroit, succeeding Mr. Collins.

Crystal Washing Machine Secures New Manufacturing Quarters.—With its manufacturing facilities greatly increased and new machinery installed, the Crystal Washing Machine Co. of Detroit, is now building 1000 electric washing machines monthly. New manufacturing quarters have been secured by the company and its floor space now totals 35,000 sq. ft. The Crystal company builds all the parts of its machine with the exception of the electric motor and wringer. On the first floor of its main building are the shipping and metal departments. In the latter the sheets of Armco metal used in making the tanks and cylinders are formed and soldered. The tanks are then placed in the metal frames of the machines and elevated to the second floor where the assembled units from the machine shop, located in a separate building, are attached. The machines are then given the first coat of primer paint and placed in the drying room for five hours.

When thoroughly dry, the machines, are moved upon an elevated platform where the motors are installed. Being placed upon a platform, the lower sections of the machines are in a direct line with the workmen's eyes and perfect alignment of the motors is assured. The wringers are next attached and the machines are operated for three or four hours, after which they are thoroughly tested.

The finishing coat of paint is then applied, after which the machines are subjected to another thorough test, and then taken to the shipping department where each is crated separately. A most thorough system of inspection prevails throughout the plant, and the result of every operation in the machine shop, as well as the other departments, is inspected before the units are passed on for assembling.

During the last five years many improvements and refinements have been made in the design and construction of the Crystal washing machine. All belts and chains have been eliminated; the specially designed motor is enclosed, while an automatic friction release prevents all danger of blowing out motor or fuses. Its perforated zinc cylinder revolves in one direction with sufficient force to cleanse the daintiest linens or coarsest fabrics thoroughly. The cylinder is so constructed that the clothes are kept open at all times for the free passage of the water, steam and suds through the meshes of the cloth. The cylinder capacity is eight sheets or their equivalent in other clothes at one loading.

The Crystal machine takes up only 30 by 28-in. floor space, weighs 170 lb. and has a galvanized steel or copper body. It is beautifully finished with pearl gray, waterproof enamel. The Crystal wringer swings in three different positions and reverses. The wringer and washer can be operated at the same time. The wringer has a safety release while the wringer lock is conveniently located, as is the control of the wringer.

F. C. Sebulske, general manager of the Crystal Washing Machine Co., says that the ever-increasing demand for Crystal washers is ample evidence that women are becoming more and more interested in labor-saving devices for the home. He asserts that as a result of an investigation he has recently made, he is firmly convinced that electric washing machines will, within a few years, be regarded as a necessity in practically all the homes that are wired for electric service.

Assembling Room in Plant of Crystal Washing Machine Co.

View in Large Stock Room of Crystal Washing Machine Co.

Current News

Weekly Record of Construction Activities—Conventions

EASTERN STATES.

Claremont, N. H.—The Claremont Power Co. has installed a new generator in its plant at Claremont, N. H. This generator is a 400-kv-a. alternator and is direct-connected to the water wheels.

Claremont, N. H.—The town of Claremont is about to install a motor-driven siren or compressed-air whistle on the fire-alarm system to be operated by electric current furnished by the Claremont Power Co.

Amsden, Vt.—Amsden Lime Co., which has been closed down for a number of years, has recently changed hands and has begun operation again. This quarry is located near the transmission line of the Colonial Power & Light Co. and the new owners are favorably considering the installation of electric power. The lime which this company puts out is used for building purposes and is considered of the best quality. On account of the building boom in this territory the company will no doubt flourish.

Rutland, Vt.—Pincus & Donnelly Co., North Poultney, has completed arrangements for the complete electrification of its slate quarry. Power for operation will be furnished by the Western Vermont Power & Light Co., Rutland.

Springfield, Vt.—The Board of Village Trustees has made arrangements for extensions in the local electric street lighting system, to include the installation of additional lighting units.

South Poultney, Vt.—Construction work has been started for an extension to the William Griffith Slate Co. at South Poultney. This quarry will be changed from steam to electric drive and will have about 120 hp. connected as soon as the line is completed. The Griffith Slate Co. is financing the cost of construction of the line.

Windsor, Vt.—Windsor Foundry Corp. has been incorporated under the laws of Vermont with an authorized capital of $200,000. The new company has purchased the Windsor plant of the Cooley-Wright Manufacturing Co. of Waterbury, Vt., and the business will be continued in the present plant until such time as arrangements can be made to build a new plant at Windsor. The plans for the proposed plant call for a building 80 by 200 ft. and with all modern equipment. One part of the equipment it is considering installing is an electric steel furnace. This will be the only steel furnace in the vicinity and will mean additional load for the Colonial Power & Light Co.

New Britain, Conn.—Landers, Frary & Clark, manufacturers of electrical appliances, etc., have taken bids for the construction of the proposed brick structure, about 50 by 100 ft. Davis & Brooks, New Britain, are architects for the company.

Brooklyn, N. Y.—Brooklyn Edison Co., 360 Pearl street, has awarded a contract to John Thatcher & Son, 60 Park avenue, for alterations and improvements in its power plant on 66th street, near First avenue.

Brooklyn, N. Y.—Bristol-Myers Co., 277 Greene avenue, has under consideration the erection of additions to its plant at Hillside township, N. J. The work includes a boiler plant. William M. Bristol, president of the company.

Greenwich, N. Y.—Greenwich Electric Co. is understood to be considering plans for the erection of a large new addition to its local power plant to provide for increased capacity. H. C. Grey is engineer for the company.

Long Island City, N. Y.—Cole Duncan Boiler Co., 15 Clay street, Brooklyn, has had plans prepared for the construction of a new one-story brick, steel and concrete plant, about 30x120 ft., to be located at Borden avenue and Creek street, Long Island City. The works will be used for increased capacity.

Montauk, N. Y.—Bureau of Yards and Docks, Navy Department, has completed plans for the erection of a new power plant at the local Government site. C. W. Parksj is chief.

New York, N. Y.—Waco Manufacturing Co., a Massachusetts organization, has filed notice of authorization to operate in New York with a capital of $50,000 for the manufacture of electrically operated heating appliances, etc. J. R. Baker, 101 Duane street, has been appointed to act as local representative.

New York, N. Y.—Fire recently damaged the plant of the Empire Lighting Fixture Co., 224-6 Center street, manufacturer of electric light and gas fixtures. The company is understood to be planning for immediate repairs.

New York, N. Y.—Max Garfunkel, 303 Fifth avenue, has had plans prepared for the erection of a one-story brick addition to his power plant. In connection with other proposed work, the structure is estimated to cost $25,000.

New York, N. Y.—New York Edison Co. has recently been awarded a contract for furnishing electric energy for the operation of elevator equipment in the Hotel Ashton, Madison avenue and 93rd street. The management of the hotel has recently completed a change in the elevator equipment from the hydraulic type to electrically operated apparatus.

Niagara Falls, N. Y.—Niagara Falls Power Co., Canal Basin, has awarded a contract for the erection of a one-story extension to its local power plant, about 65x238 ft. The structure, which is estimated to cost $160,000 with equipment, will be used for increased capacity. The Read-Coddington Co., Portage road, Niagara Falls, is the building contractor.

Niagara Falls, N. Y.—The plant of the United States Light & Heat Corp. is to be enlarged by the construction of several new buildings. Several acres of adjoining property have been purchased to provide for extensions. The plant already covers nine acres.

Rochester, N. Y.—Rochester Railway & Light Co. will issue bonds to the amount of $500,000 for an addition to its power house.

Syracuse, N. Y.—Orders have been received in Syracuse by officials of the Lackawanna and New York Central Railroads issued by the Railroad Administration for the curtailment of certain work on improvements, etc. Included in the order is the proposed power plant to be erected by the latter organization at Solvay, estimated to cost about $500,000.

Syracuse, N. Y.—The city has had plans prepared for the installation of additional lighting units in its street lighting system on Clinton avenue. It is also proposed to extend the system from Clinton avenue south to South Goodman street.

Bloomfield, N. J.—Sprague Electric Works of the General Electric Co. is using the new addition to its plant completed some few months ago, for the manufacture of electric controlling devices, including rheostats, commutators, etc. The company has developed some interesting apparatus with improvements over previous types of equipment.

Camden, N. J.—Public Service Corp. is arranging for extensive repairs and improvements in its rolling stock, following the recent fare increase granted by the Board of Public Utility Commissioners.

Dover, N. J.—New Jersey Power & Light Co. has inaugurated operations in its plant at Bernardsville for the production of ice. The plant has a capacity of about 14 tons of ice per day.

Newark, N. J.—Independent Lamp & Wire Co., 1733 Broadway, New York, is considering the erection of a new four-story plant on property recently acquired on Runyon street, Newark, bounded by Hillside and Belmont avenues. Nathan Hofheimer is president of the company.

Newton, N. J.—Newton Electric & Gas Co. had a hearing at Newark before the Public Utility Commission recently regarding the construction of a line from Dover to Newton to supply them with current from the New Jersey Power & Light Co. The Commission granted its request and it is expected that the construction work on this line will soon be commenced by the New Jersey Power & Light Co. The cost of the line will be approximately $40,000.

Perth Amboy, N. J.—The Board of Aldermen is understood to be arranging plans for the furnishing of electric power for industrial purposes, the plans calling for the erection of a new plant, estimated to cost in the neighborhood of $60,000.

Sussex, N. J.—The Sussex Borough Council has awarded a contract to the local electric company for an increase in the supply of electric energy for street-lighting purposes.

Dover, Del.—Keokuk Power Transmission Co., Keokuk, Iowa, a Delaware corporation, has filed notice with the Secretary of State of an increase in its capital from $200,000 to $800,000, to provide for general business expansion.

Monkton, Md.—Monkton Roller Mills has awarded a contract to E. H. Mosher, Munsey building, Baltimore, for the erection of a hydroelectric power plant, to be used for the operation of its local flour mills. The work is estimated to cost $30,000.

Harrisburg, Pa.—The City Council has passed ordinances providing for extension in the electric street-lighting system in the Fourteenth Ward, including the installation of new lighting units. Clark E. Diehl is city electrician.

Johnstown, Pa.—The Board of Directors of the Memorial Hospital, Napoleon street, has completed plans for the erection of a new two-story boiler plant and laundry building at the institution, about 45x70 ft. The structure is estimated to cost $50,000. W. R. Myton, First National Bank building, is architect.

Kingston, Pa.—Kingston Coal Co. is planning to commence work at an early date on the installation of a large new electrically operated pumping unit, about 18 ft. high, 25 ft. long and 15 ft. wide, of the quintuple type, recently constructed for the company by the Aldrich Pump Co., Allentown. The unit has a capacity of discharging 3,000,000 gal. of water per day from a depth of 700 ft., which required a 500 hp. rating steam turbine operating at 6000 r.p.m. These revolutions are stepped down to 600, and then by a double helical gear wheels are reduced to 50 r.p.m. at the pump.

Philadelphia, Pa.—Considerable new electrical, power plant and heating equipment will be required in connection with the proposed addition and alterations and improvements at the plant of C. A. Asher, located at 21 Armat street, Germantown section, manufacturer of confectionery. Ballinger & Perrot, 17th and Arch streets, are architects for the company.

Philadelphia, Pa.—In connection with the ordinance recently introduced in the City Council providing for a proposed municipal loan of $14,750,000 for improvements, etc., it is understood that an appropriation of $300,000 of this amount will be devoted to electrical bureau construction, including additions, extensions and improvements.

DATES AHEAD.

Vancouver Association Electrical Contractors and Dealers. Convention, Vancouver, B. C., May 26 and 27. Secretary, Capt. W. J. Conway, 406 Yorkshire building, Vancouver, B. C.

Illinois Association of Electrical Contractors and Dealers. Summer convention, Decatur, Ill., June. Secretary, N. M. Blumenthal, 179 West Washington street, Chicago.

Electrical Supply Jobbers' Association. Annual convention, Hot Springs, Va., June 10, 11 and 12. Headquarters, The Homestead Hotel. Secretary, Franklin Overbagh, 411 South Clinton street, Chicago.

Tri-State Water and Light Association. Annual convention, Greenwood, S. C., June 17-19. Secretary-treasurer, W. F. Stieglitz, Columbia, S. C.

American Society of Mechanical Engineers. Spring meeting, Hotel Statler, Detroit, Mich., June 17-20. Secretary, Calvin W. Rice, 29 West 39th street, New York City.

American Institute of Chemical Engineers. Summer meeting, Boston, Mass., June 18-21. Secretary, Prof. J. C. Olsen, Polytechnic Institute, Brooklyn, N. Y.

American Institute of Electrical Engineers. Annual convention, Adirondacks, N. Y., June 24-27. Headquarters, Lake Placid Club. Secretary, F. L. Hutchinson, 33 West 39th street, New York.

National Association of Electrical Contractors and Dealers. Annual convention, Milwaukee, Wis., July 15, 16 and 17. General manager, William H. Morton, 110 West 40th street, New York City.

Ohio Electric Light Association. Annual meeting, Cedar Point, Ohio. July 15-18. Headquarters, Breakers Hotel. Secretary, D. L. Gaskill, Greenville, Ohio.

International Association of Municipal Electricians. Annual convention, Chicago, Sept. 23-26. Secretary, Clarence R. George, Houston, Tex.

Association of Iron and Steel Electrical Engineers. Annual convention, St. Louis, Mo., September, 1919. Secretary, John F. Kelly, Empire building, Pittsburgh, Pa.

National Association of Electrical Inspectors. Annual meeting, Springfield, Mass., Oct. 13 and 14. Secretary, W. L. Smith, Concord, Mass.

Illuminating Engineering Society. Annual convention, Chicago, Ill., October. General secretary, Clarence L. Law, 29 West 39th street, New York City.

Pittsburgh, Pa.—Fire recently damaged the boiler plant at the refinery of the A. D. Miller's Sons Co., Preble and Columbus avenues. It is understood that the structure will be immediately rebuilt.

Durham, N. C.—The city has completed plans for the installation of an electric street-lighting system of the "white way" type, the work being estimated to cost $30,000.

Hobgood, N. C.—The council is planning ways and means to establish municipal light plant. Address mayor.

Ehrhardt, S. C.—Ehrhardt Manufacturing Co. has organized and will install a telephone, electric light system, ginnery and ice plant. J. M. Kinard, president.

Rock Hill, S. C.—Stegall Water & Light Co. has filed notice with the Secretary of State of an increase in its capital from $25,000 to $30,000, to provide for general business expansion.

Fort Gaines, Ga.—Georgia-Alabama Power Co. has recently completed negotiations for the purchase of a large tract of land on the Pataula Creek, as a site for the construction of a hydroelectric power plant. The proposed plans include the erection of new concrete dams, the project to cost approximately $200,000. Dermott Shemwell, Lexington, N. C., is president.

Lyerly, Ga.—Catooga River Power Co. has broken ground for the construction of an electric power plant at East Lyerly, to be located on the Chattooga river, for the furnishing of electric energy for industrial purposes to East Lyerly, Owings, and neighboring sections.

Lyons, Ga.—An election will be held to decide the question of issuing bonds for electric light plant. Address mayor.

Reidsville, Ga.—The city has awarded a contract to the J. B. McCrary Co., Atlanta, for the installation of a municipal electric light plant. The structure is estimated to cost $12,000.

Springfield, Ga.—Fire recently destroyed practically the entire local power plant, and it is understood that plans are being arranged for immediate rebuilding.

Savannah, Ga.—A $1,500,000 meat packing plant will be established here by interests headed by Imbris & Co., James Imbris, president, New York City. An electric light and power plant, ice and refrigerating plant and by-products plant will be established in connection therewith.

Jacksonville, Fla.—St. Elmo W. Acosta, Albert J. Bucky, John A. Cunningham and associates will seek legislative authority for constructing and operating electric railway between Jacksonville and beach points, it being proposed that the line cross the bridge to be built here over St. Johns River.

Winter Garden, Fla.—The city is understood to be arranging plans for the construction of a new power plant to be used for municipal service. W. H. Reams is mayor.

NORTH CENTRAL STATES.

Cincinnati, Ohio.—Resolutions asking estimate cost of installing boulevard lights on McMillan street, from May street to Woodburn avenue on Gilbert avenue, from Gilbert avenue viaduct to Locust street, will be introduced in council by Cliff E. Martin, councilman.

Cleveland, Ohio.—Architect Geo. S. Rider, 612 Century building, has prepared plans and will let contracts for a $35,000 factory to be erected by the Leonard Electric Manufacturing Co., 433 Champlain avenue. The building will be of concrete construction, two stories high, steam heating, plumbing and electric lighting.

Cleveland, Ohio.—Jordan Motor Car Co., East 152d street, will erect

a $78,000 power plant. The building will be two and one-half stories high, brick and concrete construction, plumbing and electric lighting. Contracts have been let to Hunkin Conkey Co., Century building. The specifications include dynamos, generators, switchboards, cement floor, modern coal feeding equipment, boilers, engine pump, etc.

Columbus, Ohio.—Northern Ohio Traction & Light Co. has filed application with the Public Utilities Commission for permission to issue bonds for $6,708,000, a portion of the proceeds to be used, it is understood, for extensions and improvements, etc.

Hamilton, Ohio.—An ordinance has passed the council providing for an issue of $17,000 in bonds to improve the electric light plant. Address Frank Weaver, city clerk.

Martins Ferry, Ohio.—The city will vote on the question of issuing $450,000 in bonds to consolidate municipal lighting and water plants.

Sandusky, Ohio.—Sandusky Gas & Electric Co. has recently completed the installation of a new switchboard at the Lawrence Street station. The company has been awarded a contract for furnishing electric energy for the operation of the proposed plant of the Maibohm Motors Co. to be located at Sandusky.

Minerva, Ohio.—May 20 an election will be held to decide the question of issuing $50,000 in bonds for extending and repairing the municipal electric light plant. Address city clerk.

Fort Wayne, Ind.—Board of Public Works will install ornamental lights on Crescent avenue between State street and Lake avenue. Address Secretary A. R. Wynekan, Board of Public Works, Fort Wayne, Ind.

Indianapolis, Ind.—Hatfield Electric Co. has received the wiring contract for $1010 for two cottages and one hospital to be erected at the Indiana Epileptic Village. The Cornell Engineering Co. received the major contract on a bid of $59,000.

Newcastle, Ind.—Maxwell Motor Co. has authorized the expenditure of $75,000 for new houses for employees. About 200 new houses will be built by the Greater Newcastle Co., a subsidiary company.

South Bend, Ind.—Studebaker Corp. has begun to erect sub-assembly and stock building, 192x1057 ft. The company will erect a new power house to supply 8000 hp., and will erect a new machine shop 475x1125 ft., one-half of which is completed at the present time. Besides these buildings there will be the foundry, the press steel stamping plant, heat treating and carbonizing plant, closed body plant and final assembly plant. The total additions will occupy sixty-one acres of land and will contain between 3,000,000 and 4,000,000 sq. ft. of floor space, and the capacity of the total completed buildings will be 500 automobiles a day.

Terre Haute, Ind.—The Indiana Public Service Commission has held that the Terre Haute, Indianapolis & Eastern Traction Co. shall discount its rates for electric service 10% in Terre Haute and the Terre Haute district and 15% at Brazil, West Terre Haute, Vermilion, Staunton, Seelyville, Harmony and Knightsville. The company applied for an increase in rates but the Commission ordered a reduction. The reduced rates are effective until August 1, 1920.

Charleston, Ill.—The residents of 10th, 11th, 12th and 13th streets have petitioned the Illinois Central Public Service Co. to extend its electric system.

Gillespie, Ill.—Southern Illinois Light & Power Co. will erect an $80,000 power plant here. Address manager.

Palmyra, Ill.—Palmyra Light, Heat & Power Co. has filed a petition with the Illinois Public Utilities Commission, asking for a certificate of convenience and necessity to operate, construct and maintain a transmission line from Palmyra to Waverly, in Macoupin county; also distribution lines in the village of Modesto and to transact a general business of rendering electric service in those villages. Address Louis M. King, president.

Rock Island, Ill.—City proposes to change an additional 100 arc lights for Mazdas. The city has now 210 arc lights in service with a yearly cost of $12,000. There are 556 mazdas in service at a cost of $11,676 a year. If the plan proves feasible a saving of $4000 can be made.

Springfield, Ill.—Weaver Manufacturing Co. will erect a $25,000 warehouse with floor space of 20,000 sq. ft.

Springfield, Ill.—The Board of Local Improvements will install an ornamental system of lighting in Reservoir Park. Address secretary of the board of local improvements.

Midland, Mich.—Andrew S. Arburn, city clerk of village council, contemplates opening bids for electric power plant equipment, such as electric street lamps, etc. Cost not to exceed $15,000.

Port Huron, Mich.—Loran C. Elliott, clerk of council, will shortly open bids on new street and bridge ornamental electric lights not to exceed $10,000.

Port Huron, Mich.—Commissioner Boynton at a session of the city commission introduced a resolution for the placing of 400-watt electric lights between Wall and Court streets and one light on each of the following corners: St. Clair and Glenwood, Ninth and Griswold, Eighth and Pine and 15th street at the Harrison school house. The resolution was approved unanimously and the Port Huron Gas & Electric Co. will be notified to place the lights named.

St. Louis, Mich.—Bids will be called in the near future for a $40,000 municipal plant. Address D. T. Kemps, mayor.

Sturgis, Mich.—The Board of Public Works is considering ways and means to provide for emergency electric power. Address Mayor Freeland.

Sparta, Wis.—Wisconsin-Minnesota Light & Power Co. has leased the ground west of the ice house to the Winona Oil Co. which will erect a building and tanks there.

Superior, Wis.—The council has received a petition to extend ornamental lighting from Tower avenue to Weeks avenue. Address city clerk.

Woodstock, Wis.—The proposition to bond the city for $25,000 to improve its electric light plant carried.

Little Falls, Minn.—Considerable new power equipment is being installed in the plant of the Little Falls Water Power Co. The new outfit will double the present capacity of the plant, 1500 hp. being added.

Montevideo, Minn.—Contract has been closed by the Southwestern division of Northern States Power Co. covering 25 hp. for the Farmers Elevator Co. Re-connection has been made of 100 hp. for the Hanlon-Oakes rock crushing plant at Pipestone.

Centerville, Iowa.—Iowa Southern Utilities Co., operating 33 miles of interurban, besides the Centerville street railway and light plants in 25 southern Iowa towns, with property valued at $2,500,000 has been purchased by David C. Fisher & Co. of Davenport. It is proposed to rebuild and enlarge power plant.

Davenport, Iowa.—M. L. Parker Co. will erect a seven-story building, 90 x140 ft., a counterpart of the present Parker building and to be connected with the original building by a two or three story structure. The building will be of brick, steel and concrete construction, fireproof and will cost about $500,000.

Dubuque, Iowa.—J. S. Kimmel, of the Electrical Equipment Co., Delco light distributor, has opened a retail business for the sale of electric fixtures and appliances.

DeWitt, Mo.—At a recent election, it was voted to have electric lights. Extension lines will be constructed from Carrollton to supply the current.

Mexico, Mo.—Mexico Power Co. has completed arrangements for the installation of a quantity of new equipment in its plant, to provide for increased operations. The work is estimated to cost $40,000.

St. Louis, Mo.—Employees of the St. Louis County Gas Co., a subsidiary of the Union Tlectric Light & Power Co., will be represented on the company's board of directors. The statement to this effect was made with the Employees Mutual Benefit Association that the company, together with the regulations of the Missouri Public Service Co., is entitled to a return on its investment and all surplus shall go to the public in lower rates or to the employes in wages.

Dunlap, Kans.—The construction of an electric light plant is contemplated.

Liberal, Kans.—Plans are being made for the installation of a white way system.

Pukwana, S. D.—An election carried for the issuing of bonds for the construction of a municipal lighting plant.

Sioux Falls, S. D.—Twenty-five farmers living between Hartford and Wall Lake have signed an agreement with the Hartford Light & Power Co. to secure their electric current for light and power on their farms. The Hartford Light & Power Co. secures its current from the Northern States Power Co.

SOUTH CENTRAL STATES.

Louisville, Ky.—Interstate Public Service Co. has purchased the interurban property of the Indianapolis and Louisville Traction Co. between Sellersburg and Seymour, Ind. The purchase will give the company complete control of the right-of-way from Indianapolis to Louisville, with the exception of the Big Four bridge over the Ohio river. The Interstate Public Service Co. controls and operates the Louisville-Indianapolis Interurban, the Louisville & Northern Railway & Lighting Co. and the Louisville & Southern Indiana Traction Co.

Paintsville, Ky. — Wells-Elkhorn Coal Co., recently incorporated, expects to install three power plants in the near future and equip three mines with motors and machines. Address C. O. Messenger, general manager.

Chattanooga, Tenn.—Chattanooga Armature Works, 3 Duncan avenue, has awarded a contract for the erection of a new plant, about 47x60 ft., to be used for increased capacity. Estimated cost about $5000. S. U. Steffner is manager.

Coalfield, Tenn.—Coalfield Coal Co. is understood to be arranging plans for the rebuilding of the portion of its power plant recently destroyed by fire at its local works, with loss estimated at about $5000.

Ripley, Tenn.—The city has approved the issuance of bonds to the amount of $150,000, to provide for the construction of a new light, water and sewer system. Calvin Conner is mayor.

Donaldson, La.—The city is understood to be considering plans for extensions in the municipal light and power system. Joseph W. Byrnes is in charge of the work.

Heber Springs, Ark.—Plans have been completed for the construction of a hydroelectric dam in Little Red river at a cost of $263,000. The dam will be 40 ft. high and with the spillway will require 7000 cu. yds. of concrete work and 2000 cu. yds. of excavation. Contract will be let about July 1.

Springdale, Ark.—The installation of an electric light plant is contemplated. W. L. Winters, Fort Smith, engineer.

Enid, Okla.—Enid division of Oklahoma Gas & Electric Co. is negotiating with the city officials of Kingfisher with the view of supplying the town's requirements of electric energy and also the large mills situated there which have been using their own power. Plans have been approved for the erection of a seven-story hotel at Enid, costing $250,000.

Commerce, Okla.—The council will install ornamental lighting in commerce and other streets. Address mayor.

Grove, Okla.—The city is having plans prepared for alterations and improvements in the municipal electric-light and water plant to facilitate operations.

Sapulpa, Okla.—During the week ended May 1 the electric energy output of the Sapulpa Electric Co., amounted to 93,107 kw.-hr. which is greater than any previous week in the company's history. The output on April 25 was 15,495 kw-hr., which breaks all previous daily output records.

Sapulpa, Okla.—Sapulpa Electric Co. has secured contract with the local Board of Education covering the electric light and power requirements of the $300,000 high school now being constructed. It is anticipated that approximately 100 hp. in motors will be required, and about 15 kw. for lighting.

Sulphur, Okla.—Paul G. Liebman, recently discharged from service, has taken over the management of the Citizens Light Co. and will start plans at once for the construction of a modern light plant and ice factory.

Tulsa, Okla.—The city is arranging plans for the extension of its electric street-lighting system on 15th street to Terrace Drive. The plans also include the installation of additional street-lighting units in the West Tulsa district.

Abilene, Tex.—Plans are being made for the construction of new gas, electric and water plant to cost about $400,000 to replace the plant recently destroyed by fire.

Dallas, Tex.—Dallas Power & Light Co. is understood to be negotiating for the purchase of the properties of the Dallas Ice, Fuel, Light & Power Co. and the Carroll Electric Co., said to involve the expenditure of approximately $500,000. It is said that the company plans for a consolidation of these interests.

Fort Worth, Tex.—Fort Worth-Mineral Wells Interurban Association has employed Fred A. Jones, engineer of Dallas, to make a survey for the proposed interurban line that is to be constructed between Fort Worth and Mineral Wells, 60 miles. The route is through the towns of Poolville, Springtown, Reno, Agnes and Advance.

Gonzales, Tex.—Gonzales Water Power Co. will increase the capacity of its hydroelectric plant by installing additional machinery to cost about $80,000.

Groveton, Tex.—Groveton Light & Ice Co. has sold its electric light plant at Groveton to Hayne Nelms and associates. New machinery will be installed.

Ranger, Tex.—Theodore J. Hansard desires prices on electric signs for airdome.

Stephenville, Tex.—An appropriation of $40,000 has been secured for a central heating and lighting plant for John Tarleton Agricultural College and the contract will be let at once, so that the work can be completed for the fall term of school.

WESTERN STATES.

Florence, Ariz.—May 28 bids will be received for constructing a $80,000 light and water system. Address S. M. Bailey, city clerk.

Red Lodge, Mont.—Northwestern Improvement Co., No. 3 will build a new turbine power plant and condenser. Address C. C. Anderson, general manager.

Dallas, Ore.—Mountain States Power Co. has secured a contract with the Warren Construction Co. covering 50 hp. in motors, and also with the Oregon Gravel & Construction Co. for an additional 90 hp.

Seattle, Wash.—Committees of the Chamber of Commerce, Commercial Club, and the Industrial Association of the South End, have asked the city to construct an electric car line along the Duwamish waterway to serve industries in the extreme southern part of the city. It will be known as the East Marginal Way line. Industries along that waterway have not adequate facilities for transporting their employes to and from work, where about 2000 are employed. This waterway has been improved and is maintained by the U. S. Government.

Seattle, Wash.—Thos. F. Murphine, superintendent of public utilities, has outlined a program of construction for the betterment of the municipal railway system, which comprises extensions of several lines, double-tracking others, constructing loops, trestles, freight sheds, car barns and the completion of the municipal elevated railway to the Youngstown district. Utility bonds amounting to $790,000 will be issued and sold to meet the expenses of the work planned.

Spokane, Wash.—Spokane Central Heating Co., made up of officers of the Washington Water Power Co., has been incorporated, with a capital stock of $1,000,000, to take over the property of the Spokane Heat, Light & Power Co., which went into the hands of a receiver last year. The new company will operate the electrical department of the property taken over.

Oildale, Cal.—The Oildale Water District is arranging for an increase in its bond issue from $20,000 to $40,000, to provide for the installation of a new water system.

Pasadena, Cal.—The City Council has awarded a contract to the Maloney Electric Co. for supplying new transformer equipment to be used for the municipal light works department.

Redding, Cal.—Pacific Gas & Electric Co. is arranging for the early resumption of work at its power development in the Big Bend of the Pit river. E. B. Hanley is manager of the land department.

San Bernardino, Cal.—Application has recently been filed with the municipal authorities by the Southern California Edison Co. for permission to construct and maintain for a period of 30 years a local system, including conduits, cables and wires, poles, etc.

Stockton, Cal.—The Stockton division of the Western States Gas & Electric Co. has received application from the Sperry Flour Co. for 450 hp. in motors to operate its new Crown Mills. The company will also supply the Pacific Gas & Electric Co. with an additional 150 hp. in motors to operate its new pumping plant at Stockton.

Mesa, Ariz.—The Water Users' Association is remodeling the hydraulic portion of the Chandler electric generating plant, 1½ miles northeast of Mesa, for the purpose of adding another power generating unit to the electric system of the association.

PROPOSALS

Transformers.—Bids will be received May 26 for furnishing and delivering 400-kva. transformers at the Chicago Avenue Pumping Station and one 400-kva. transformer at the 68th street Pumping Station. Address Charles R. Francis, Commissioner of Public Works, Chicago.

Electric Furnaces.—The Bureau of Ordnance of the Navy Department has opened bids for the construction of two 30-ton electric furnaces in the new armor and gun plant at Charleston, W. Va. The outlay for the proposed electric furnace plant will approximate $200,000 and it is to be completed in nine months.

NEW PUBLICATIONS

Aluminum and Its Light Alloys.—The Bureau of Standards, Department of Commerce, has issued Circular 75 entitled "Aluminum and Its Light Alloys." The physical properties of aluminum and its light alloys are described and the effect of temperature, different manufacturing operations, and impurities upon these properties are discussed. Copies of this bulletin will be furnished on request.

Trading with the Far East, a companion volume to "Trading with Latin America," is a new title in the Foreign Trade series issued by the Irving National Bank. It marshals facts and information for the man who is too busy to gather them firsthand, and outlines effective ways of meeting the problems arising in connection with the routine of trade activity in the Orient. In acquainting the manufacturer or exporter with outstanding factors in trade beyond the Pacific, it provides an interpretation for commercial purposes of conditions in what promises to be one of our most exceptional markets for years to come.

Occupations in the Electrical Manufacturing Industries.—The Federal Board for Vocational Education has prepared several opportunity monographs of its Series No. 25 and issued in co-operation with the office of the Surgeon General, War Department, and Bureau of Medicine and Surgery, Navy Department. These have been issued primarily for disabled soldiers, sailors and marines to aid them in choosing a vocation. One of the series is devoted to "Occupations in the Electrical Manufacturing Industries." It is believed that because of the constant expansion in applications of electricity, the number of workers engaged in electrical manufacturing industries must increase materially and that an extensive field is offered to those who have been disabled in the world's great struggle. This monograph indicates briefly the opportunities presented in those occupations which are peculiar to electrical manufacturing and gives the following classifications of vocations wholly electrical: Engineering and drafting; coil winding and taping; coil impregnating and painting; coil placing and connecting; assembling; inspection and repair, and testing.

INCORPORATIONS

New York, N. Y.—David Simon Corp. Capital, $20,000. To engage in a general electrical and mechanical engineering capacity. Incorporators: D. B. Foth, R. Cahane, and L. Weinstock, 39 Beekman Street.

New York, N. Y.—Peerless Brass Specialty Manufacturing Co. Capital, $25,000. To manufacture electric and gas appliances, etc. Incorporators: B. Seidman, R. J. Kupferman, and E. Muller, 1954 65th street, Brooklyn.

Waterbury, Conn.—Gordon Electric Manufacturing Co. Capital, $75,000. To manufacture electrical devices, etc. Incorporators: A. J. Smith, I. R. Seltzer, and N. A. Niell, Waterbury.

Bridgeport, Conn. — Abercrombie-Bock Electric Co. Capital, $10,000. To manufacture electrical supplies, etc. Incorporators: Francis J. and Harry C. Abercrombie, Bridgeport, and Fred W. Bock, Hartford.

New York, N. Y.—Bell-Schoenleber Manufacturing Co. Capital, $100,000. To manufacture electrical supplies. Incorporators: T. H. Bell, J. G. Schoenleber, and W. A. Ritchie, 201 West 53d street.

Cuba, N. Y.—Cuba Electric Co., Cuba, Allegheny County. Capital, $50,000. To operate a local plant. Incorporators: R. H. Bartlett, H. E. Keller, and G. M. Bartholomew, Cuba.

Utica, N. Y.—Solville Electric Light & Power Co. Capital, $10,000. To operate a local electric light and power plant. Incorporators: L. F. Joerissen, M. A. Owens, and L. J. Horrigan.

Jackson, Miss.—Public Utilities Co. has incorporated with a capital of $250,000 by R. E. Kennington, H. V. Watkins and others. Electric equipment will be purchased.

South Bend, Ind.—South Bend Battery Service Co. has been incorporated with capital of $10,000 to deal in electrical supplies. The directors are E. A. Bennett, D. A. Shafer and Harry W. Brewster.

New York, N. Y.—Belzo Electric Motor Co. Capital, $250,000. To manufacture electric motors, etc. Incorporators: H. C. McCullum, E. F. Schwartz, Jr., and H. C. Field, 34 Nassau street.

New York, N. Y.—Charles L. Silberman Co. Capital, $100,000. To deal in electrical supplies and kindred apparatus. Incorporators: I. Goldstein, and P. D. and C. I. Silberman, 47 Norfolk street.

New York, N. Y.—Kawakita Electric Corp. Capital, $200,000. To manufacture electric specialties, etc. Incorporators: I. O. Pas, N. C. Sugi, and E. D. Spunt, 15 Park Row.

New York, N. Y.—Adjustable Drop Light Co. Capital, $25,000. To manufacture special lighting devices, etc. Incorporators: W. Kliehe, H. Koenig, and C. Capehart, Times Building.

Jersey City, N. J.—Jersey City Storage Battery Co. Capital, $10,000. To manufacture storage batteries, etc. Incorporators: W. P. Lightfoot, L. L. Kelts, and H. S. Cook.

Newark, N. J.—Leo T. Wallen Co. Capital, $100,000. To engage in a general electrical and mechanical engineering capacity. Incorporators: Harry Hanflein, Leo T. and Frederick F. Wallen, Newark.

East Orange, N. J.—Burgler Starter & Battery Co. Capital, $50,000. To engage in the manufacture of electric batteries, dynamos, and kindred apparatus. Incorporators: H. H. Picking, H. O. Geyer, and E. R. Coburn, East Orange.

Dover, Del.—Maximum Power Co. Capital, $100,000. To manufacture motors, parts, motorcycles, etc. Incorporators: M. M. Clancy, T. L. Croteau, and P. B. Drew, Wilmington.

Pittsburgh, Pa.—American Router & Manufacturing Co. Incorporated under Delaware laws with a capital of $50,000. To manufacture electrically-operated routing machines, etc. Incorporators: Samuel Hunter, Beaver, Pa.; Otto Stickel, Ligonier, Pa., and Frederick Forrester, Pittsburgh.

Buffalo, N. Y.—Electric Twin Water Purification Corp. Capital, $100,000. To engage in the manufacture of electrically-operated water purification devices, water filters, etc. Incorporators: J. Roche, R. J. Parker, and H. W. Smead, Buffalo.

Lanyon, Iowa.—Farmers Electric Light & Power Association has incorporated with a capital of $5000 by J. A. Anderson and others.

South Bend, Ind.—Incorporation papers for the Interstate Electrical Supply Co. have been filed, showing the company to have capital of $100,000. The company will do a wholesale electrical business with South Bend as the basis. Those interested are Donald MacGregor, J. W. Arnold, S. D. Moran and C. P. Luxton.

Anderson, Ind.—Snyder Electrical Co. has been incorporated with capital of $10,000 by R. E. Snyder, M. I. Snyder and Arthur C. Call.

Pemberville, Ohio.—Riverside Light & Power Co. has incorporated with a capital of $6000 by Edward M. Fries.

Coalfield, Tenn.—Coalfield Coal Co. is planning to rebuild burned power plant. Estimated cost $5000.

Barneston, Neb.—Beatrice Power Co. has incorporated with a capital of $200,000 and will engage in the manufacture and production of electric current and to maintain a hydro-electric plant at Barneston. It is expected that in the near future plans may be put into effect which will enable the township of Plymouth to receive electric lighting from the Beatrice plant. J. H. Steinmeyer, O. B. Dempster and others, incorporators.

Personal

A. E. Hitchner Receives Promotion—A. G. Carson Made Superintendent of Wisconsin Public Service — Changes

WILLIAM L. DEBAUFRE has resigned his position with the Naval Engineering Experiment Station, Annapolis, Md., to become designing engineer of the Precision Instrument Co., Detroit, Mich.

WILLIAM WREN HAY, who has spent several months abroad as civilian engineer purchasing officer, U. S. Army, has returned to this country. He has organized an export business with headquarters in New York City.

RALPH B. KENNARD, until recently connected with the Niagara, Lockport & Ontario Power Co., Buffalo, N. Y., in the capacity of chief draftsman, has become affiliated with the engineering department of the New Jersey Zinc Co., Palmerton, Pa.

CHARLES EISLER, chief engineer and engineer in charge of the equipment, designing and development departments of the Westinghouse Lamp Co., Bloomfield, N. J., for about five years, is now associated with the recently organized Save Electric Corp., Brooklyn, N. Y., in the capacity of superintendent of the equipment, designing and development departments.

R. B. GALLUP, who has been engaged for some time in special work in the engineering and appraisal departments of the Home Telephone & Telegraph Co., Fort Wayne, Ind., has been appointed purchasing agent for the company. This position has assumed special importance since the appropriation of the sum of $50,000 by the company to be devoted largely to the internal improvements of the company's equipment. Mr. Gallup assumed his new duties May 1. He will not release all of his duties in the engineering department. Mr. Gallup has been with the Home Telephone & Telegraph Co. for the last eight years. He was formerly with the Inter-State Telephone & Telegraph Co., Aurora, Ill.

A. E. HITCHNER has been appointed manager of the mining section of the industrial sales department of the Westinghouse Electric & Manufacturing Co. with headquarters at East Pittsburgh, Pa. Mr. Hitchner is a graduate of Rutger's College, class of 1904. He served a two-year apprenticeship with the Baldwin Locomotive Works, and spent three years with the Link-Belt Co. on construction work before joining the Westinghouse sales organization as industrial salesman in its Philadelphia office in 1909. In 1912 he was sent as sales representative to the anthracite coal field and placed in charge of the Wilkes-Barre office, where he has gained an intimate knowledge of coal mining and mining methods. In his new position Mr. Hitchner will handle the sale of all apparatus made by the Westinghouse company for use in the mining industry.

LOUIS W. SIPLEY, formerly with the Midvale Steel & Ordnance Co., is now sales engineer for the Electric Storage Battery Co., Philadelphia.

H. J. PETERS, superintendent of the city light, power and heating plant at Port Washington, Wis., for about eight years, has accepted a similar position at Hartford, Wis.

W. H. DIEFENDORF, Syracuse, N. Y., chief engineer and director of the New Process Gear Corp., has resigned to become affiliated with the Weeks-Hoffman Co., Syracuse.

WILLIAM CRUMPTON, electrical engineer, formerly with Ford, Bacon & Davis, of New York City, has recently become associated with Dwight P. Robinson & Co., engineers, of New York City.

LEWIS A. BELDING, who for the past two years has been assistant professor of mechanical engineering at Stevens Institute of Technology, Hoboken, N. J., has become associated with the Thomas A. Edison interests at Orange, in the power service division, as service engineer.

GREGORY BROWN, of the New York office of the Western Electric Co., has been appointed manager of the Newark house, succeeding W. T. Walker. Mr. Brown joined the company in 1905 as a member of the engineering department. He became affiliated with the telephone sales organization in 1911 and in 1914 was made acting assistant manager of the Cincinnati office. In 1916 he came to the New York house as supply specialist, remaining in this capacity until his recent appointment.

A. G. CARSON, superintendent of the Eastern Wisconsin Railway & Light Co., Fond du Lac, Wis., and who has been manager of the Manitowoc & Northern Traction Co. for two years, has been appointed general superintendent of the Wisconsin Public Service Co. This appointment adds to his many duties of supervising the electric and power departments and the railway department of the Public Service Co. of Green Bay. Mr. Carson will divide his time between Manitowoc, Two Rivers and Green Bay, taking charge of the railway department and the electric light and power department at Green Bay at once, thus becoming principal assistant to the vice-president and general manager, C. R. Phenicie. Before going to Manitowoc Mr. Carson was superintendent of the Eastern Wisconsin Electric Co., of Fond du Lac. He was chief engineer of the Wisconsin Electric Railway and the Eastern Wisconsin Electric Railway & Light Co. in Oshkosh for several years when J. P. Pulliam was general manager and Clement C. Smith president of those companies.

DUNCAN MACLENNAN, district plant chief at the Worcester (Mass.) exchange of the New England Telephone & Telegraph Co., has been elected president of the R. D. Hunter Co., Worcester, recently organized.

GEORGE W. MENTZ, Philadelphia, Pa., has recently been elected vice-president of the Philadelphia Traction Co., the West Philadelphia Passenger Railway, the Union Passenger Railway and the Continental Passenger Railway, to succeed Alexander Rennick, deceased.

CHARLES W. PRICE, of New York City, president of the Electrical Review Publishing Co., and chairman, board of directors of the International Trade Press, Inc., publisher of the ELECTRICAL REVIEW, has been elected a director at large of the Society for Electrical Development for a period of two years.

HAL G. TRUMP, for the last four years manager of the Chicago office of the Green-Fulton Cunningham Co., has joined the staff of the Campbell-Ewald Co., Detroit, Chicago and New York. Mr. Trump will make his headquarters at the Detroit office. His experience embraces the positions of space buyer, copy chief, service sales. He was at one time advertising and assistant sales manager of the Van Dyke Motor Car Co. and later advertising manager of *The American Boy.*

R. C. STARR has resigned as superintendent of construction of the Stone & Webster Corp., with headquarters in Seattle, to become construction engineer of the San Joaquin Light & Power Corp., Fresno, Cal. Mr. Starr has charge of work on the hydroelectric project now being constructed to meet the demand for additional power. Previous to his connection with the Stone & Webster organization he had charge of raising the height of three dams at Huntington Lake in Southern California for the Pacific Light & Power Co

LIEUT. ROBERT MONTGOMERY, 146th U. S. Infantry, has received his honorable discharge and resumed civil life as commercial manager of the Louisville Gas & Electric Co., Louisville, Ky. While overseas Lieutenant Montgomery was town major for a number of towns in France and was thereby thrown in close contact with the French people and given an excellent opportunity to study their needs. He expresses the belief that France will look to America for machines and mechanical engineers and scientific managers and that in the next two years a great opportunity for American industrial genius will be afforded. In the rehabilitation of French industry, it is necessary that it be put on a basis to compete with English and German trade and it will be necessary to change the slow hand-made articles to quantity production.

Financial News

Review of Stock and Bond Situation in California.

Financing of public utilities in California since the signing of the armistice is setting a new record, according to W. C. Fankhauser, stock and bond expert for the Railroad Commission. Authorizations of issues of stocks, bonds and notes during the first four months of 1919 total $27,990,552.02, compared with $13,641,461.66 during the corresponding period of last year. This activity is an indication of the rapidity with which California is emerging from the atmosphere of war conditions and is restoring her business and industrial enterprises to normal.

The public utility security market though fluctuating and with prices of securities still below their intrinsic value, shows an upward tendency. Comparative figures presented show that while utility stocks have not reached the pre-war level, there is a marked increase in price. The improved market conditions, however, enable public utilities to proceed with construction work.

Included in the $27,990,552.02 of stocks, bonds and notes, the issue of which the Railroad Commission authorized during the preceding four months, are $3,941,000 Northwestern Pacific Railroad Co. bonds, $8,000,000 of bonds and $8,000,000 of debentures of Southern California Edison Co., $800,000 of Sutter-Butte Canal Co. bonds, $474,000 of Midland Counties Public Service Corp. bonds, $517,000 of Southern Counties Gas Co. of California bonds, $450,000 of Western States Gas & Electric Co. bonds and $437,331 of East Bay Water Co. class "A" 6% preferred stock. Pacific Gas & Electric Co. sold $3,500,000 of bonds, the issue of which was authorized prior to the signing of the armistice.

The Southern California Edison Co. sold $8,000,000 of 30-year 6% bonds and $8,000,000 of 7% 10-year serial debentures. The proceeds were used to pay a $10,000,000 bond issue, due July 1, 1919, and liquidate short-term notes representing moneys expended for improvements. The company has outlined a three-year construction program calling for an expenditure of $18,945,000, of which $11,445,000 will go into new hydroelectric plants and $7,500,000 in general improvements. The refunding of the maturing obligations puts the company in a condition to proceed with its construction program.

Arrangements have been made by the Great Western Power Co. to sell $6,000,000 of 6% 30-year bonds and $1,500,000 of 7% preferred stock. The company proposes to build a hydroelectric generating plant of 40,000-kw. present capacity on the north fork of the Feather river and a transmission line from the new plant to Valona, Contra Costa county, a distance of 192 miles. The plant will ultimately have a capacity of 136,000 kw. This development calls for the construction of a nine-mile standard gage railroad from the Western Pacific to the plant site, so that material may be more economically handled. It also involves the raising of the spillway at Lake Almanor nine feet, thereby increasing the reservoir capacity of the lake from 300,000 to 380,000 acre ft.

These are typical examples of the extensive construction work planned by Pacific coast utilities, and it is expected with the return to normal conditions improvements and extensions will proceed rapidly.

The cessation of the war, the removal of building restrictions, less difficulty in procuring efficient labor, a decline in prices, a wider market for public utility securities, indicate that there will be a considerable activity in public utility construction during the remainder of this year.

Michigan Railroad Bonds Offered.

The National City Co., of New York and Chicago, is offering $4,500,000 first mortgage 6% five-year bonds of the Michigan Railroad Co. at 95. These bonds are due May 1, 1924, and yield about 7.21%. They are secured by an absolute first mortgage on the entire property of a railroad of the most modern construction and equipment, costing considerably over twice the amount of this issue and located largely on private right of way. This electrically operated railway of 156 miles of track connects such important centers in the state of Michigan as Grand Rapids, Kalamazoo, Battle Creek, Bay City, Saginaw and Flint, and serves a population estimated to exceed 450,000.

Great Western Power Bonds Purchased.

A syndicate composed of E. H. Rollins & Sons, Bonbright & Co. and Lee, Higginson & Co. has purchased $3,000,000 first and refunding mortgage 6% bonds for the Great Western Power Co. of California, due March 1, 1949. A public offering of these bonds is being made.

Lincoln Company to Continue Rates.

The Lincoln Water & Light Co. is authorized to continue until June 30, 1919, the temporary increase of rates for electric service and water service in Lincoln granted it May 14, 1918, in an order issued recently by the Illinois Public Utilities Commission.

On May 14, 1918, the commission granted this company a temporary increase in rates for its service, these rates not to remain in effect after May 1, 1919. The company has made application to this commission for permission to further advance its rates for electric and water service in Lincoln. The commission has not had an opportunity to pass upon the issues raised in the last application of said company, except as the same may relate to a temporary continuance of the rates authorized by the order of the commission on May 14, 1918, and pending a decision on the last application of said company, the commission now orders that the rates ordered to be placed in effect on May 14, 1918, shall continue temporarily until June 30, 1919.

Havana Electric Reports Large Increase in Gross Earnings.

The annual report of the Havana Electric Railway, Light & Power Co., as submitted by the general manager, presents statistics for the year 1918 showing an increase in the gross earnings of the company of 16.98% over 1917. The net earnings from operation were 12.39% greater than last year, notwithstanding that operating expenses increased 22.8% and that after deduction of both United States and Cuban taxes there still remains a gain of 5.43% in net earnings over the preceding year. The gross receipts from all sources were $8,317,439.67, while the total expenditures for construction aggregated $637,146.58. Customs duties paid on imports into Cuba amounted to $159,814.14.

The improvement in public lighting has continued and during the year 153 high efficiency lamps in 1000 and 600 cp. units and 83 less brilliant lamps were installed. The increase in electrical output was 15.3%, and the increase in net earnings on account of electric lighting 8.7%. The increase in gross earnings in the electric light and power department exceeded all former records, but the operating expenses were even greater than the preceding year, due almost entirely to the high cost of fuel and the rise in material prices.

Western States Gas & Electric Bond Issue Authorized.

The Railroad Commission of California has granted to the Western States Gas & Electric Co. authority to issue $450,000.00 of its first and refunding mortgage 5% gold bonds due June 1, 1941. These bonds shall be sold at not less than 82½% plus accrued interest, and the proceeds of the issue will be used for the purpose of financing in part the construction expenses incurred.

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

Public Utilities.	Div. rate. Per cent.	Bid May 13	Bid May 20.
Adirondack Electric Power of Glens Falls, common	6	14	13
Adirondack Electric Power of Glens Falls, preferred	6	74	70
American Gas & Electric of New York, common	10+extra	148	170
American Gas & Electric of New York, preferred	6	41	41
American Light & Traction of New York, common	..	266	257
American Light & Traction of New York, preferred	6	98	98¼
American Power & Light of New York, common	4	60	63
American Power & Light of New York, preferred	6	74	75
American Public Utilities of Grand Rapids, common	..	..	..
American Public Utilities of Grand Rapids, preferred	7	30	33
American Telephone & Telegraph of New York	..	104¼	103⅜
American Water Works & Elec. of New York, common	..	4½	4½
American Water Works & Elec. of New York, particip	7	10	10
American Water Works & Elec. of New York, first preferred	..	58	58
Appalachian Power, common	..	3	3
Appalachian Power, preferred	7	12	10
Cities Service of New York, common	+extra	382	379
Cities Service of New York, preferred	6	79⅛	79¾
Commonwealth Edison of Chicago	8	111	111
Comm. Power, Railway & Light of Jackson, common	..	23	26½
Comm. Power, Railway & Light of Jackson, preferred	6	50	54½
Federal Light & Traction of New York, common	..	10	9
Federal Light & Traction of New York, preferred	..	46	46
Illinois Northern Utilities of Dixon	6	..	70
Middle West Utilities of Chicago, common	2+extra	35	35
Middle West Utilities of Chicago, preferred	6	60	60
Northern States Power of Chicago, common	..	70	72
Northern States Power of Chicago, preferred	ex.div.7	90	90
Pacific Gas & Electric of San Francisco, common	..	58	58½
Pacific Gas & Electric of San Francisco, preferred	6	88	88
Public Service of Northern Illinois, Chicago, common	7	92	88
Public Service of Northern Illinois, Chicago, preferred	6	90	92
Republic Railway & Light of Youngstown, common	4	19	18
Republic Railway & Light of Youngstown, preferred	6	59	58
Standard Gas & Electric of Chicago, common	..	41	38¼
Standard Gas & Electric of Chicago, preferred	6	48½	47½
Tennessee Railway, Light & Power of Chattanooga, common	..	4½	4¼
Tennessee Railway, Light & Power of Chattanooga, preferred	6	19	20
United Light & Railways of Grand Rapids, common	4	45	46
United Light & Railways of Grand Rapids, preferred	6	72	72¼
Western Power of San Francisco, common	..	19	22
Western Union Telegraph of New York	extra	88	87⅞
Industries.			
Electric Storage of Philadelphia, common	4	75	74
General Electric of Schenectady	8	163	163¾
Westinghouse Electric & Mfg. of Pittsburgh, common	7	55¼	55½
Westinghouse Electric & Mfg. of Pittsburgh, preferred	7	56½	56½